

4.0 RISK CHARACTERIZATION

Potential risks to the selected measurement receptors from COCs detected in the media of concern at the Pownal Tannery Study Area were evaluated by the quotient method which compares estimated exposure doses with applicable toxicity reference values (TRVs). This comparison (expressed as an ecological screening quotient) is calculated for each COC as follows:

$$\text{ESQ} = \text{EEL}/\text{TRV}$$

Where:

ESQ = Ecological Screening Quotient;
EEL = Estimated Exposure Level (from Section 3.1); and,
TRV = Toxicity Reference Value (from Section 3.2).

If the calculated ecological screening quotient is less than one, then it is unlikely that that contaminant will result in an adverse effect on that measurement receptor. Conversely, an ecological screening quotient greater than one indicates that that particular measurement receptor may be at risk of an adverse effect from that contaminant. A total ESQ is also calculated based on the sum of the COC-specific ESQs to determine the risk from multiple stressors.

It is important to note that ESQs provide only a general characterization of potential impacts to the local biota. An ESQ less than one is indicative of non-risk, however, an ESQ greater than unity does not in itself represent an unacceptable risk. Other site-specific factors such as the ratio of Simultaneously Extracted Metals (SEM) to Acid Volatile Sulfides (AVS) present in the sediment may affect the initial screening calculation. In addition, the underlying assumptions used in calculating the ESQs need to be carefully reconsidered for their scientific validity.

4.1 Fish/Water Column Invertebrates Measurement Receptors

Risk to fish and water column macroinvertebrate communities from the detected COCs within the surface waters of the Hoosic River, lagoons, landfill pond/seeps, and Halifax Hollow were assessed by comparing mean and maximum concentrations of contaminants in surface water with criteria or benchmarks protective of aquatic life. The results of this evaluation are presented in Table 15.

Water quality within each of the surface water groupings was fairly consistent. No organic COC or dissolved metal COC exceeds its respective criteria/benchmark within any of the surface water samples collected within the Pownal Tannery Study Area. Total metal concentrations of aluminum and barium exceed their respective chronic benchmarks at all four surface water sample groupings while the total manganese concentration exceeds its respective chronic benchmark at the lagoon and landfill pond/seep sampling groups. The total iron concentration exceeds its chronic benchmark at the landfill pond/seep sample group only.

Table 15. Risk Summary for Surface Water COCs – Pownal Tannery Study Area

COC	Concentration (ug/L)				Chronic ESQs		Acute ESQs	
	Mean	Maximum	Chronic TRV (ug/L)	Acute TRV (ug/L)	Mean	Maximum	Mean	Maximum
Hoosic River								
1,2,3,4,6,7,8-HpCDF	9.00E-07	1.40E-06	-	-	-	-	-	-
1,2,3,4,7,8-HxCDF	8.00E-07	1.90E-06	-	-	-	-	-	-
1,2,3,6,7,8-HxCDF	7.25E-07	1.68E-06	-	-	-	-	-	-
1,2,3,7,8-PeCDD	9.60E-07	2.75E-06	-	-	-	-	-	-
2,3,7,8-TCDF	1.04E-06	2.65E-06	-	-	-	-	-	-
Aluminum	1.08E+02	1.78E+02	8.70E+01	7.50E+02	1.E+00	2.E+00	1.E-01	2.E-01
Barium	1.22E+01	1.31E+01	4.00E+00	1.10E+02	3.E+00	3.E+00	1.E-01	1.E-01
*Chromium (Dissolved)	1.38E-01	3.18E-01	5.86E+01	4.50E+02	2.E-03	5.E-03	3.E-04	7.E-04
*Copper (Dissolved)	7.17E-01	1.10E+00	7.00E+00	1.02E+01	1.E-01	2.E-01	7.E-02	1.E-01
Iron	2.11E+02	2.93E+02	1.00E+03	-	2.E-01	3.E-01	-	-
Lead (Dissolved)	ND**	ND**	-	-	-	-	-	-
Manganese	3.30E+01	3.67E+01	1.20E+02	2.30E+03	3.E-01	3.E-01	1.E-02	2.E-02
Mercury (Dissolved)	ND**	ND**	-	-	-	-	-	-
Zinc (Dissolved)	ND**	ND**	-	-	-	-	-	-
TOTAL ESQs					5.E+00	6.E+00	3.E-01	5.E-01
Lagoons								
Acetone	2.08E+00	3.00E+00	1.50E+03	2.80E+04	1.E-03	2.E-03	7.E-05	1.E-04
2-Butanone	7.50E-01	2.00E+00	1.40E+04	2.40E+05	5.E-05	1.E-04	3.E-06	8.E-06
Toluene	1.08E+00	4.00E+00	9.80E+00	1.20E+02	1.E-01	4.E-01	9.E-03	3.E-02
Bis(2-ethylhexyl)phthalate	1.50E+00	5.00E-01	3.00E+00	2.70E+01	5.E-01	2.E-01	6.E-02	2.E-02
1,2,3,4,6,7,8-HpCDD	1.03E-05	3.70E-05	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDF	2.18E-06	5.10E-06	-	-	-	-	-	-
2,3,7,8-TCDF	1.56E-06	5.00E-06	-	-	-	-	-	-
OCDF	4.23E-06	9.40E-06	-	-	-	-	-	-
Aluminum	3.05E+01	1.27E+02	8.70E+01	7.50E+02	4.E-01	1.E+00	4.E-02	2.E-01
Arsenic (Dissolved)	9.04E-01	3.90E+00	1.50E+02	3.40E+02	6.E-03	3.E-02	3.E-03	1.E-02

Table 15. Risk Summary for Surface Water COCs – Pownal Tannery Study Area

COC	Concentration (ug/L)		Chronic TRV (ug/L)		Chronic ESQs		Acute ESQs	
	Mean	Maximum	Chronic TRV (ug/L)	Acute TRV (ug/L)	Mean	Maximum	Mean	Maximum
Barium	1.69E+01	2.67E+01	4.00E+00	1.10E+02	4.E+00	7.E+00	2.E-01	2.E-01
Cadmium (Dissolved)	ND**	ND**	-	-	-	-	-	-
*Chromium (Dissolved)	3.03E+00	6.10E+00	1.23E+02	9.43E+02	2.E-02	5.E-02	3.E-03	6.E-03
Cobalt***	2.05E-01	5.20E-01	2.30E+01	1.50E+03	9.E-03	2.E-02	1.E-04	3.E-04
*Copper (Dissolved)	7.21E-01	1.60E+00	1.51E+01	2.40E+01	5.E-02	1.E-01	3.E-02	7.E-02
Iron	2.79E+02	5.37E+02	1.00E+03	-	3.E-01	5.E-01	-	-
Lead (Dissolved)	ND**	ND**	-	-	-	-	-	-
Manganese	5.73E+02	1.14E+03	1.20E+02	2.30E+03	5.E+00	1.E+01	2.E-01	5.E-01
Mercury (Dissolved)	ND**	ND**	-	-	-	-	-	-
*Nickel (Dissolved)	8.15E-01	1.30E+00	8.75E+01	7.88E+02	9.E-03	1.E-02	1.E-03	2.E-03
Silver (Dissolved)	ND**	ND**	-	-	-	-	-	-
Thallium	8.08E-01	1.60E+00	1.20E+01	1.10E+02	7.E-02	1.E-01	7.E-03	1.E-02
*Zinc (Dissolved)	2.57E+01	1.32E+02	1.99E+02	1.97E+02	1.E-01	7.E-01	1.E-01	7.E-01
				TOTAL ESQs	1.1E+01	2.0E+01	7.E-01	2.E+00
Landfill Pond/Seeps								
1,2,3,4,6,7,8-HpCDF	1.33E-06	1.00E-06	-	-	-	-	-	-
OCDF	6.72E-06	4.10E-06	-	-	-	-	-	-
Aluminum	4.49E+02	1.23E+03	8.70E+01	7.50E+02	5.E+00	1.4E+01	6.E-01	2.E+00
Antimony	5.24E-01	8.60E-01	3.00E+01	8.80E+01	2.E-02	3.E-02	6.E-03	1.E-02
Barium	2.07E+01	2.63E+01	4.00E+00	1.10E+02	5.E+00	7.E+00	2.E-01	2.E-01
Beryllium	3.01E-02	6.80E-02	6.60E-01	3.50E+01	5.E-02	1.E-01	9.E-04	2.E-03
Cadmium (Dissolved)	ND**	ND**	-	-	-	-	-	-
*Chromium (Dissolved)	4.94E+00	2.24E+01	1.06E+02	8.16E+02	5.E-02	2.E-01	6.E-03	3.E-02
Cobalt	6.47E-01	2.00E+00	2.30E+01	1.50E+03	3.E-02	9.E-02	4.E-04	1.E-03
*Copper (Dissolved)	1.19E+00	3.60E+00	1.30E+01	2.03E+01	9.E-02	3.E-01	6.E-02	2.E-01
Iron	1.16E+03	2.05E+03	1.00E+03	-	1.E+00	2.E+00	-	-
Lead (Dissolved)	ND**	ND**	-	-	-	-	-	-
Manganese	2.60E+02	5.30E+02	1.20E+02	2.30E+03	2.E+00	4.E+00	1.E-01	2.E-01

Table 15. Risk Summary for Surface Water COCs – Pownal Tannery Study Area

COC	Concentration (ug/L)		Chronic TRV (ug/L)		Chronic ESQs		Acute ESQs	
	Mean	Maximum	Chronic TRV (ug/L)	Acute TRV (ug/L)	Mean	Maximum	Mean	Maximum
Mercury (Dissolved)	1.08E-01	2.70E-01	7.70E-01	1.40E+00	1.E-01	4.E-01	8.E-02	2.E-01
*Nickel (Dissolved)	2.38E+00	1.12E+01	7.53E+01	6.78E+02	3.E-02	1.E-01	4.E-03	2.E-02
Selenium***	2.28E-01	5.90E-01	5.00E+00	-	5.E-02	1.E-01	-	-
Vanadium	1.26E+00	8.60E-01	2.00E+01	2.80E+02	6.E-02	4.E-02	5.E-03	3.E-03
Zinc (Dissolved)	ND**	ND**	-	-	-	-	-	-
TOTAL ESQs					1.4E+01	2.9E+01	1.E+00	3.E+00
Halifax Hollow								
OCDD	1.30E-05	1.30E-05	-	-	-	-	-	-
Aluminum	8.68E+01	8.68E+01	8.70E+01	7.50E+02	1.E+00	1.E+00	1.E-01	1.E-01
Barium	6.10E+00	6.10E+00	4.00E+00	1.10E+02	2.E+00	2.E+00	6.E-02	6.E-02
*Copper (Dissolved)	6.40E-01	6.40E-01	2.74E+00	3.64E+00	2.E-01	2.E-01	2.E-01	2.E-01
Iron	1.32E+02	1.32E+02	1.00E+03	-	1.E-01	1.E-01	-	-
Manganese	1.10E+01	1.10E+01	1.20E+02	2.30E+03	9.E-02	9.E-02	5.E-03	5.E-03
TOTAL ESQs					3.E+00	3.E+00	3.E-01	3.E-01

Notes:

* Hardness-dependent value. Average water hardness of each area as follows:

Hoosic River: 75 mg/L

Landfill Pond/Seeps: 155 mg/L

Lagoons: 185 mg/L

Halifax Hollow: 25 mg/L

** COC not detected in filtered samples. Retained as COC since detected in unfiltered sample (drinking water exposure pathway for indicator species).

*** COC not detected in unfiltered samples. Retained as COC as detected in filtered samples. Evaluated by comparing to total concentration TRV.

Hoosic River

The chronic mean and maximum total ESQs for the Hoosic River surface water sampling group are 5 and 6, respectively. Total acute ESQs are less than unity. Mean and maximum total concentrations of aluminum and barium each exceed their respective chronic benchmarks. However, the upgradient reference Hoosic River sample (SW-005) also contains aluminum and barium concentrations above their chronic benchmarks. Total aluminum and barium concentrations detected at the reference location are comparable to the average Hoosic River result for these metals. Therefore, it does not appear that elevated concentrations of aluminum and/or barium within the Hoosic River above chronic benchmarks are attributable to the Pownal Tannery.

Lagoon Area

The chronic mean and maximum total ESQs for the lagoon surface water samples are 11 and 20, respectively. Mean and maximum total concentrations of barium and manganese (as well as the maximum aluminum concentration) detected within the lagoon surface water samples exceed their respective chronic benchmarks. Although the total maximum acute ESQ also exceeds unity, the maximum detected concentration of all COCs do not exceed their respective acute benchmarks.

Maximum aluminum, barium, and manganese concentrations detected in a reference surface water sample (SW-003) collected within a ponded area located adjacent to and within the floodplain of the Hoosic River were higher than detected within the surface waters of the lagoons. Therefore, the risk to aquatic biota inhabiting the surface waters of the lagoons does not appear elevated above background concentrations of these metals.

Landfill Pond/Seeps

The chronic mean and maximum total ESQs for the landfill pond and seeps surface water sampling group are 14 and 29, respectively. Mean and maximum total concentrations of aluminum, barium, iron and manganese exceed their respective chronic benchmarks. The acute mean and maximum total ESQs for the landfill pond/seeps samples are 1 and 3, respectively. Aluminum (maximum concentration only) is the only COC that exceeds its respective acute benchmark.

Maximum surface water concentrations of barium and manganese detected within the reference sampling group exceed concentrations detected within the landfill pond/seeps. Therefore, risk to aquatic biota from these constituents does not appear elevated above background levels. However, the mean and maximum aluminum and iron concentrations are above background levels. Aluminum was detected above its acute benchmark at one seep location (SW-011) and above its chronic benchmark at all four seep sample locations. Although aluminum was not detected above its chronic benchmark within the landfill pond sample, the highest iron concentration was detected within the pond. Iron also exceeds its chronic benchmark in one of the seep samples (SW-011). Overall, the detected concentrations of aluminum and iron may result in adverse effects to aquatic invertebrates inhabiting the seepage areas. Aquatic

invertebrates within the water column of the landfill pond may also be at risk from the iron concentration detected within this habitat.

Halifax Hollow

The chronic and acute total ESQs for Halifax Hollow downgradient of the landfill are 3 and 0.3, respectively. Although the detected concentrations of aluminum and barium exceed their respective chronic benchmarks, the upgradient reference Halifax Hollow sample (SW-008) also contains aluminum and barium concentrations above chronic benchmarks. Total aluminum and barium concentrations detected at the reference location are above the concentrations detected within Halifax Hollow downgradient of the landfill. Therefore, it does not appear that elevated concentrations of aluminum and/or barium within the surface water of Halifax Hollow above chronic benchmarks are attributable to the landfill.

4.2 Amphibian Larvae Measurement Receptors

Risk to amphibian larvae inhabiting identified or likely amphibian breeding areas was also evaluated. The evaluation compared mean and maximum detected concentrations of COCs within the landfill pond/seeps and surface waters of the lagoon area with amphibian toxicity benchmarks. The results of this evaluation are presented in Table 16.

Total mean and maximum ESQs for the lagoon area are 2 and 7 respectively. Although the mean concentrations of all COCs did not exceed their respective TRVs, maximum detected levels of aluminum and mercury were above their TRVs indicating potential adverse effects to amphibian larvae inhabiting several of the lagoons (Lagoons 1 and 5). However, the concentration of aluminum within the reference pond exceeded the maximum detected concentration within the lagoon samples indicating risk is no greater than background.

Total mean and maximum ESQs for the landfill pond/seeps are 10 and 28, respectively. The mean aluminum and maximum aluminum and mercury concentrations exceed their respective TRVs. Both aluminum and mercury were detected within the landfill pond surface water sample at elevated levels above their TRVs. However, aluminum was detected at a higher concentration within the reference pond sample. Aluminum was detected at elevated levels (above TRV and background) within the four seep samples. However, the seep areas provide limited breeding habitat for amphibians due to the shallow water and lack of standing pools of water.

Overall, the results indicate that amphibian larvae may be at risk from the concentrations of mercury detected within the surface water at the lagoons and the landfill pond.

Table 16. Risk Summary for Amphibian Larvae – Pownal Tannery Study Area					
COC	Concentration (ug/L)		Amphibian	Amphibian ESQs	
	Mean	Maximum	TRV (ug/L)	Mean	Maximum
Lagoons					
Acetone	2.08E+00	3.00E+00	1.00E+04	2.E-04	3.E-04
2-Butanone	7.50E-01	2.00E+00	2.00E+03	4.E-04	1.E-03
Toluene	1.08E+00	4.00E+00	3.90E+02	3.E-03	1.E-02
Bis(2-ethylhexyl)phthalate	1.50E+00	5.00E-01	-	-	-
1,2,3,4,6,7,8-HpCDD	1.03E-05	3.70E-05	-	-	-
1,2,3,4,6,7,8-HpCDF	2.18E-06	5.10E-06	-	-	-
2,3,7,8-TCDF	1.56E-06	5.00E-06	-	-	-
OCDF	4.23E-06	9.40E-06	-	-	-
Aluminum	3.05E+01	1.27E+02	5.00E+01	6.E-01	3.E+00
Arsenic	7.10E-01	2.40E+00	4.00E+01	2.E-02	6.E-02
Barium	1.69E+01	2.67E+01	-	-	-
Cadmium	5.30E-02	1.50E-01	1.06E+02	5.E-04	1.E-03
Chromium	4.12E+00	1.23E+01	1.00E+03	4.E-03	1.E-02
Cobalt*	2.05E-01	5.20E-01	5.00E+01	4.E-03	1.E-02
Copper	1.59E+00	3.90E+00	2.00E+01	8.E-02	2.E-01
Iron	2.79E+02	5.37E+02	2.00E+04	1.E-02	3.E-02
Lead	6.06E-01	2.00E+00	7.50E+02	8.E-04	3.E-03
Manganese	5.73E+02	1.14E+03	1.42E+03	4.E-01	8.E-01
Mercury	1.52E-01	3.50E-01	1.60E-01	1.E+00	2.E+00
Nickel	8.36E-01	2.20E+00	5.00E+01	2.E-02	4.E-02
Silver	2.28E-01	1.10E+00	4.10E+00	6E-02	3.E-01
Thallium	8.08E-01	1.60E+00	1.10E+02	7.E-03	1.E-02
Zinc	8.08E+00	1.65E+01	1.00E+02	8.E-02	2.E-01
			TOTAL ESQ	2.E+00	7.E+00
Landfill Pond/Seeps					
1,2,3,4,6,7,8-HpCDF	1.33E-06	1.00E-06	-	-	-
OCDF	6.72E-06	4.10E-06	-	-	-
Aluminum	4.49E+02	1.23E+03	5.00E+01	9.E+00	2.5E+01
Antimony	5.24E-01	8.60E-01	3.00E+02	2.E-03	3.E-03
Barium	2.07E+01	2.63E+01	-	-	-
Beryllium	3.01E-02	6.80E-02	3.15E+04	1.E-05	2.E-05
Cadmium	7.64E-02	1.80E-01	1.06E+02	7.E-04	2.E-03
Chromium	3.18E+00	5.60E+00	1.00E+03	3.E-03	6.E-03
Cobalt	6.47E-01	2.00E+00	5.00E+01	1.E-02	4.E-02
Copper	4.75E+00	1.44E+01	2.00E+01	2.E-01	7.E-01
Iron	1.16E+03	2.05E+03	2.00E+04	1.E-01	1.E-01
Lead	4.07E+00	8.80E+00	7.50E+02	5.E-03	1.E-02
Manganese	2.60E+02	5.30E+02	1.42E+03	2.E-01	4.E-01
Mercury*	1.08E-01	2.70E-01	1.60E-01	7.E-01	2.E+00
Nickel	1.54E+00	4.90E+00	5.00E+01	3.E-02	1.E-01
Selenium*	2.28E-01	5.90E-01	9.00E+01	3.E-03	7.E-03
Vanadium	1.26E+00	8.60E-01	-	-	-
Zinc	1.06E+01	2.80E+01	1.00E+02	1.E-01	3.E-01
			TOTAL ESQ	1.E+01	2.8E+01

Notes: * COC not detected in unfiltered samples. Retained as COC as detected in filtered samples.

4.3 Benthic Invertebrate Measurement Receptors

Risk to the benthic macroinvertebrate community from the detected COCs within the sediments of the Hoosic River, lagoons, landfill pond, and Halifax Hollow were assessed by comparing mean and maximum concentrations with benchmarks protective of benthic biota. The results of this evaluation are presented in Table 17. In addition, a subset of sediment samples were analyzed for acid volatile sulfides (AVS) and simultaneously extracted metals (SEM). The ratio of SEM:AVS is useful in assessing the bioavailability of divalent metals (e.g., cadmium, copper, lead, mercury, nickel, and zinc). Therefore, the results of the SEM:AVS analyses are also used in evaluating potential impacts to benthic invertebrates from divalent metal contaminants of concern.

Sediment quality within each of the sediment groupings varied considerably. COCs detected above low or chronic effect levels included several VOCs, PAHs, pesticides and inorganics within the Hoosic River, landfill pond and lagoons. COCs detected above severe or acute effect levels were primarily limited to several inorganics within the lagoon sediments. Results are discussed below for each of the sediment grouping within the Pownal Tannery Study Area.

Hoosic River

The chronic mean and maximum total ESQs for the Hoosic River sediment sampling group are 25 and 140, respectively. Total mean and maximum acute ESQs are 5 and 30, respectively. The maximum detected concentrations of total PAHs, three pesticides (4,4-DDD, 4,4-DDE, and gamma-BHC) and two metals (lead and mercury) exceed their respective acute benchmarks.

Mean concentrations of total PAHs, four pesticides (same as discussed above and heptachlor epoxide), and three inorganics (barium, cyanide, and mercury) exceed their respective chronic TRVs. The maximum detected concentrations of toluene, two individual PAHs (fluoranthene and phenanthrene), five additional pesticides (aldrin, alpha-chlordane, endrin ketone, gamma-chlordane, and methoxychlor), and eight additional inorganics (cadmium, chromium, copper, iron, lead, manganese, nickel and zinc) also exceed their respective chronic TRVs (see Table 17).

The locations of chronic and acute TRV exceedences elevated above reference sample concentrations for each Hoosic River sediment sample are presented in Figure 12. SEM:AVS ratios are also depicted in Figure 12.

In general, the most highly contaminated sediments within the Hoosic River were located along the western bank of the river above the North Pownal dam. Concentrations of PAHs, pesticides, and a variety of inorganics were detected above chronic TRVs at sample locations SD-025 and SD-043. The concentrations of total PAHs, mercury and DDT pesticide derivatives (4,4-DDD and 4,4-DDE) were detected above acute TRVs at one or both of these locations.

Table 17. Risk Summary for Sediment COCs – Pownal Tannery Study Area

COC	Concentration (ug/kg)*		Chronic TRV (ug/kg)***	Acute TRV (ug/kg)****	Chronic ESQs		Acute ESQs	
	Mean	Maximum			Mean	Maximum	Mean	Maximum
Hoosic River								
Acetone	1.00E+01	1.00E+01	1.79E+01**	-	6.E-01	6.E-01	-	-
Methylene Chloride	3.45E+00	4.00E+00	4.63E+02**	5.50E+03**	7.E-03	9.E-03	6.E-04	7.E-04
Toluene	2.09E+01	3.40E+02	6.25E+01**	7.50E+02**	3.E-01	5.E+00	3.E-02	5.E-01
2-Methylnaphthalene	6.90E+02	6.90E+02	See total PAHs	See total PAHs	-	-	-	-
4-Methylphenol	3.08E+02	3.20E+02	6.70E+02	-	5.E-01	5.E-01	-	-
Acenaphthene	1.50E+02	1.50E+02	see total PAHs	see total PAHs	-	-	-	-
Acenaphthylene	1.73E+02	7.70E+02	see total PAHs	see total PAHs	-	-	-	-
Anthracene	2.83E+02	2.70E+03	see total PAHs	see total PAHs	-	-	-	-
Benzaldehyde	2.10E+02	2.10E+02	-	-	-	-	-	-
Benzo(a)anthracene	5.91E+02	5.40E+03	see total PAHs	see total PAHs	-	-	-	-
Benzo(a)pyrene	6.10E+02	6.50E+03	see total PAHs	see total PAHs	-	-	-	-
Benzo(b)fluoranthene	4.81E+02	3.80E+03	see total PAHs	see total PAHs	-	-	-	-
Benzo(g,h,i)perylene	2.06E+02	1.20E+03	see total PAHs	see total PAHs	-	-	-	-
Benzo(k)fluoranthene	4.41E+02	3.40E+03	see total PAHs	see total PAHs	-	-	-	-
Bis(2-ethylhexyl)phthalate	2.46E+02	2.60E+03	1.11E+06**	-	2.E-04	2.E-03	-	-
Carbazole	2.20E+02	2.20E+02	-	-	-	-	-	-
Chrysene	6.16E+02	5.30E+03	see total PAHs	see total PAHs	-	-	-	-
Dibenzo(a,h)anthracene	1.40E+02	8.60E+02	see total PAHs	see total PAHs	-	-	-	-
Dibenzofuran	6.90E+01	6.90E+01	5.25E+02**	9.25E+03**	1.E-01	1.E-01	7.E-03	7.E-03
Diethylphthalate	4.10E+01	4.10E+01	7.50E+02**	6.50E+03**	5.E-02	5.E-02	6.E-03	6.E-03
Di-n-butylphthalate	6.20E+02	6.20E+02	5.39E+05	-	1.E-04	1.E-04	-	-
Fluoranthene	1.02E+03	8.50E+03	3.63E+03**	see total PAHs	3.E-01	2.E+00	-	-
Fluorene	1.73E+02	8.00E+02	see total PAHs	see total PAHs	-	-	-	-
Indeno(1,2,3-cd)pyrene	2.88E+02	2.50E+03	see total PAHs	see total PAHs	-	-	-	-
Naphthalene	1.30E+02	1.30E+02	see total PAHs	see total PAHs	-	-	-	-
Pentachlorophenol	2.00E+02	2.00E+02	3.60E+02	-	6.E-01	6.E-01	-	-
Phenanthrene	9.47E+02	1.00E+04	1.06E+03**	see total PAHs	9.E-01	9.E+00	-	-
Pyrene	1.33E+03	1.40E+04	see total PAHs	see total PAHs	-	-	-	-
Total PAHs	7.57E+03	6.60E+04	3.63E+03**	2.25E+04**	2.E+00	1.8E+01	3.E-01	3.E+00
4,4-DDD	4.05E+00	3.40E+01	3.54E+00	8.51E+00	1.E+00	9.6E+00	5.E-01	4.E+00
4,4-DDE	4.97E+00	4.80E+01	1.42E+00	6.75E+00	3.E+00	3.4E+01	7.E-01	7.E+00
4,4-DDT	2.33E+00	7.00E+00	8.00E+00	8.88E+02**	3.E-01	9.E-01	3.E-03	8.E-03
Aldrin	1.31E+00	6.60E+00	2.00E+00	1.00E+02	7.E-01	7.E+00	1.E-02	7.E-02
alpha-BHC	1.54E+00	5.10E+00	6.00E+00	1.25E+02**	3.E-01	9.E-01	1.E-02	4.E-02

Table 17. Risk Summary for Sediment COCs – Pownal Tannery Study Area

COC	Concentration (ug/kg)*		Chronic TRV (ug/kg)***	Acute TRV (ug/kg)****	Chronic ESQs		Acute ESQs	
	Mean	Maximum			Mean	Maximum	Mean	Maximum
alpha-Chlordane	1.37E+00	7.50E+00	4.50E+00	8.90E+00	3.E-01	2.E+00	2.E-01	8.E-01
Aroclor 1242	3.68E+01	1.80E+02	2.13E+02**	4.85E+03**	2.E-01	8.E-01	8.E-03	4.E-02
Aroclor 1254	9.41E+01	8.40E+02	1.01E+03**	1.84E+04**	9.E-02	8.E-01	5.E-03	5.E-02
Aroclor 1260	5.10E+01	2.70E+02	5.63E+06**	-	9.E-06	5.E-05	-	-
delta-BHC	1.09E+00	1.80E+00	1.50E+02	-	7.E-03	1.1E+02	-	-
Dieldrin	2.26E+00	4.10E+00	6.50E+01**	-	3.E-02	6.E-02	-	-
Endosulfan Sulfate	2.54E+00	5.90E+00	6.88E+00**	-	4.E-01	9.E-01	-	-
Endrin	3.01E+00	1.40E+01	2.50E+01**	-	1.E-01	6.E-01	-	-
Endrin Ketone	2.32E+00	8.20E+00	2.67E+00	6.24E+01	9.E-01	3.E+00	4.E-02	1.E-01
gamma-BHC (Lindane)	1.24E+00	3.90E+00	9.40E-01	1.38E+00	1.E+00	4.E+00	9.E-01	3.E+00
gamma-Chlordane	1.37E+00	5.00E+00	4.50E+00	8.90E+00	3.E-01	1.E+00	2.E-01	6.E-01
Heptachlor	1.23E+00	2.70E+00	8.50E+01**	1.56E+03**	1.E-02	3.E-02	8.E-04	2.E-03
Heptachlor Epoxide	1.05E+00	1.1E+00	6.00E-01	2.74E+00	2.E+00	2.E+00	4.E-01	4.E-01
Methoxychlor	1.11E+01	2.60E+02	2.38E+01	-	5.E-01	1.1E+01	-	-
1,2,3,4,6,7,8-HpCDD	1.93E-01	2.52E+00	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDF	3.18E-02	3.88E-01	-	-	-	-	-	-
1,2,3,4,7,8,9-HpCDF	1.61E-03	1.83E-02	-	-	-	-	-	-
1,2,3,4,7,8-HxCDD	1.45E-03	1.93E-02	-	-	-	-	-	-
1,2,3,4,7,8-HxCDF	1.98E-03	2.07E-02	-	-	-	-	-	-
1,2,3,6,7,8-HxCDD	5.67E-03	6.73E-02	-	-	-	-	-	-
1,2,3,6,7,8-HxCDF	1.24E-03	1.22E-02	-	-	-	-	-	-
1,2,3,7,8,9-HxCDD	2.91E-03	3.58E-02	-	-	-	-	-	-
1,2,3,7,8,9-HxCDF	3.84E-04	4.60E-03	-	-	-	-	-	-
1,2,3,7,8-PeCDD	6.07E-04	7.68E-03	-	-	-	-	-	-
1,2,3,7,8-PeCDF	5.89E-04	4.55E-03	-	-	-	-	-	-
2,3,4,6,7,8-HxCDF	1.74E-03	1.81E-02	-	-	-	-	-	-
2,3,4,7,8-PeCDF	1.07E-03	6.14E-03	-	-	-	-	-	-
2,3,7,8-TCDD	3.78E-04	4.61E-03	1.28E+02**	-	3.E-06	4.E-05	-	-
2,3,7,8-TCDF	2.28E-03	1.89E-02	-	-	-	-	-	-
OCDD	1.04E+00	1.22E+01	-	-	-	-	-	-
OCDF	9.14E-02	1.10E+00	-	-	-	-	-	-
Aluminum	5.31E+03	8.39E+03	1.40E+04	-	4.E-01	6.E-01	-	-
Arsenic	1.88E+00	5.80E+00	5.90E+00	1.70E+01	3.E-01	1.E+00	1.E-01	3.E-01
Barium	2.25E+01	6.62E+01	2.00E+01	-	1.E+00	3.E+00	-	-
Beryllium	1.54E-01	3.90E-01	-	-	-	-	-	-

Table 17. Risk Summary for Sediment COCs – Pownal Tannery Study Area

COC	Concentration (ug/kg)*		Chronic TRV (ug/kg)***	Acute TRV (ug/kg)****	Chronic ESQs		Acute ESQs	
	Mean	Maximum			Mean	Maximum	Mean	Maximum
Cadmium	2.47E-01	1.50E+00	6.00E-01	3.50E+00	4.E-01	3.E+00	7.E-02	4.E-01
Chromium	1.73E+01	8.19E+01	3.73E+01	9.00E+01	5.E-01	2.E+00	2.E-01	9.E-01
Chromium(Hexavalent)	1.63E-01	1.63E-01	-	-	-	-	-	-
Cobalt	6.39E+00	9.80E+00	-	-	-	-	-	-
Copper	2.49E+01	1.74E+02	3.57E+01	1.97E+02	7.E-01	5.E+00	1.E-01	9.E-01
Cyanide	1.59E-01	6.60E-01	1.00E-01	-	2.E+00	7.E+00	-	-
Iron	1.30E+04	1.92E+04	2.00E+04	4.00E+04	7.E-01	1.E+00	3.E-01	5.E-01
Lead	2.33E+01	9.48E+01	3.50E+01	9.13E+01	7.E-01	3.E+00	3.E-01	1.E+00
Manganese	3.14E+02	7.08E+02	4.60E+02	1.10E+03	7.E-01	2.E+00	3.E-01	6.E-01
Mercury	2.72E-01	2.30E+00	1.74E-01	4.86E-01	2.E+00	1.3E+01	6.E-01	5.E+00
Nickel	1.15E+01	2.05E+01	1.80E+01	3.59E+01	6.E-01	1.E+00	3.E-01	6.E-01
Silver	3.30E-01	2.30E+00	4.50E+00	-	7.E-02	5.E-01	-	-
Thallium	1.50E-01	1.50E-01	-	-	-	-	-	-
Vanadium	5.28E+00	1.00E+01	-	-	-	-	-	-
Zinc	6.79E+01	1.78E+02	1.23E+02	3.15E+02	6.E-01	1.E+00	2.E-01	6.E-01
				TOTAL ESQs	2.5E+01	1.4E+02	5.E+00	3.0E+01
Lagoons								
1,2,4-Trichlorobenzene	5.72E+01	4.30E+02	9.60E+03**	6.01E+04**	6.E-03	4.E-02	1.E-03	7.E-03
1,2-Dichlorobenzene	5.22E+01	3.70E+02	3.30E+02**	6.10E+03**	2.E-01	1.E+00	9.E-03	6.E-02
1,4-Dichlorobenzene	2.28E+01	1.65E+02	3.40E+02**	4.12E+03**	7.E-02	5.E-01	6.E-03	4.E-02
Acetone	1.27E+02	6.73E+02	1.43E+01**	-	9.E+00	4.7E+01	-	-
2-Butanone	4.16E+01	5.10E+01	2.70E+02**	4.68E+03**	2.E-01	2.E-01	9.E-03	1.E-02
Carbon Disulfide	1.49E+02	1.25E+03	8.50E-01**	1.60E+01**	1.8E+02	1.5E+03	9.E+00	7.8E+01
Methyl Acetate	1.18E+02	9.50E+02	-	-	-	-	-	-
Methylene Chloride	5.00E+00	5.00E+00	3.70E+02**	4.40E+03**	1.E-02	1.E-02	1.E-03	1.E-03
Tetrachloroethylene	4.41E+01	3.20E+02	4.10E+02**	3.46E+03**	1.E-01	8.E-01	1.E-02	9.E-02
Tetrahydrofuran	7.00E+00	7.00E+00	-	-	-	-	-	-
Toluene	4.00E+00	4.00E+00	5.00E+01**	6.00E+02**	8.E-02	8.E-02	7.E-03	7.E-03
Xylene (Total)	4.00E+00	4.00E+00	1.60E+02**	2.77E+03**	3.E-02	3.E-02	1.E-03	1.E-03
2,2-oxybis(1-Chloropropane)	1.74E+02	3.40E+02	-	-	-	-	-	-
2,4-Dichlorophenol	2.92E+02	1.40E+03	-	-	-	-	-	-
2,4-Dimethylphenol	3.03E+02	1.50E+03	2.90E+01	-	1.0E+01	5.2E+01	-	-
2-Nitroaniline	1.90E+02	1.90E+02	-	-	-	-	-	-
2-Nitrophenol	1.81E+02	4.00E+02	-	-	-	-	-	-
4-Chloro-3-methylphenol	1.65E+02	2.60E+02	-	-	-	-	-	-

Table 17. Risk Summary for Sediment COCs – Pownal Tannery Study Area

COC	Concentration (ug/kg)*		Chronic TRV (ug/kg)***	Acute TRV (ug/kg)****	Chronic ESQs		Acute ESQs	
	Mean	Maximum			Mean	Maximum	Mean	Maximum
4-Chloroaniline	2.41E+02	9.40E+02	-	-	-	-	-	-
4-Nitrophenol	1.90E+02	1.90E+02	-	-	-	-	-	-
Anthracene	2.20E+01	2.20E+01	see total PAHs	see total PAHs	-	-	-	-
Benzaldehyde	1.50E+02	1.50E+02	-	-	-	-	-	-
Benzo(a)anthracene	1.34E+02	2.80E+02	see total PAHs	see total PAHs	-	-	-	-
Benzo(a)pyrene	1.33E+02	2.70E+02	see total PAHs	see total PAHs	-	-	-	-
Benzo(b)fluoranthene	1.20E+02	1.20E+02	see total PAHs	see total PAHs	-	-	-	-
Benzo(k)fluoranthene	1.30E+02	2.70E+02	see total PAHs	see total PAHs	-	-	-	-
Bis(2-chloroethoxy)methane	2.47E+02	1.00E+03	-	-	-	-	-	-
Bis(2-chloroethyl)ether	1.72E+02	3.20E+02	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	2.84E+02	1.35E+03	8.90E+05**	-	3.E-04	2.E-03	-	-
Caprolactam	2.47E+02	1.00E+03	-	-	-	-	-	-
Chrysene	1.30E+02	1.30E+02	see total PAHs	see total PAHs	-	-	-	-
Di-n-butylphthalate	5.90E+01	5.90E+01	1.10E+04**	-	5.E-03	5.E-03	-	-
Di-n-octylphthalate	1.69E+02	3.00E+02	1.00E+05**	-	2.E-03	3.E-03	-	-
Diethylphthalate	5.02E+02	1.70E+03	6.00E+02**	5.20E+03**	8.E-01	3.E+00	1.E-01	3.E-01
Fluoranthene	1.66E+02	4.30E+02	2.90E+03**	see total PAHs	6.E-02	1.E-01	-	-
Indeno(1,2,3-cd)pyrene	7.30E+01	7.30E+01	see total PAHs	see total PAHs	-	-	-	-
Isophorone	2.81E+02	1.30E+03	-	-	-	-	-	-
N-Nitroso-di-n-propylamine	1.91E+02	4.90E+02	-	-	-	-	-	-
Naphthalene	1.83E+02	4.20E+02	see total PAHs	see total PAHs	-	-	-	-
Nitrobenzene	5.03E+02	3.30E+03	3.21E+02**	-	2.E+00	1.0E+01	-	-
Phenanthrene	1.33E+02	2.75E+02	8.50E+02**	see total PAHs	2.E-01	3.E-01	-	-
Pyrene	1.58E+02	3.60E+02	see total PAHs	see total PAHs	-	-	-	-
Total PAHs	1.38E+03	2.65E+03	2.90E+03**	1.80E+04**	5.E-01	9.E-01	8.E-02	1.E-01
4,4-DDD	8.70E+00	3.35E+01	3.54E+00	8.51E+00	2.E+00	9.E+00	1.E+00	4.E+00
4,4-DDE	5.48E+00	1.58E+01	1.42E+00	6.75E+00	4.E+00	1.1E+01	8.E-01	2.E+00
4,4-DDT	1.30E+00	1.30E+00	8.00E+00	7.10E+02**	2.E-01	2.E-01	2.E-03	2.E-03
Aldrin	1.16E+00	2.40E+00	2.00E+00	8.00E+01**	6.E-01	1.E+00	1.E-02	3.E-02
alpha-BHC	1.23E+00	2.50E+00	6.00E+00	1.00E+02**	2.E-01	4.E-01	1.E-02	3.E-02
alpha-Chlordane	1.10E+00	1.10E+00	4.50E+00	8.90E+00	2.E-01	2.E-01	1.E-01	1.E-01
Aroclor 1242	4.11E+01	9.25E+01	1.70E+02**	3.88E+03**	2.E-01	5.E-01	1.E-02	2.E-02
Aroclor 1248	7.16E+01	4.45E+02	1.00E+03**	1.72E+04**	7.E-02	4.E-01	4.E-03	3.E-02
Aroclor 1254	2.53E+01	5.38E+01	8.10E+02**	1.47E+04**	3.E-02	7.E-02	2.E-03	4.E-03
beta-BHC	2.22E+00	7.50E+00	5.00E+00	2.10E+02**	4.E-01	2.E+00	1.E-02	4.E-02

Table 17. Risk Summary for Sediment COCs – Pownal Tannery Study Area

COC	Concentration (ug/kg)*		Chronic TRV (ug/kg)***	Acute TRV (ug/kg)****	Chronic ESQs		Acute ESQs	
	Mean	Maximum			Mean	Maximum	Mean	Maximum
delta-BHC	1.92E+00	5.30E+00	1.20E+02**	-	2.E-02	4.E-02	-	-
Endosulfan II	4.80E-01	4.80E-01	5.50E+00**	-	9.E-02	9.E-02	-	-
Endosulfan Sulfate	2.29E+00	6.80E+00	5.50E+00**	-	4.E-01	1.E+00	-	-
Endrin	4.20E-01	4.20E-01	2.00E+01**	-	2.E-02	2.E-02	-	-
Endrin Ketone	2.67E+00	5.80E+00	2.67E+00	6.24E+01	1.E+00	2.E+00	4.E-02	9.E-02
gamma-BHC (Lindane)	1.04E+00	1.50E+00	9.40E-01	1.38E+00	1.E+00	2.E+00	8.E-01	1.E+00
gamma-Chlordane	2.17E+00	5.10E+00	4.50E+00	8.90E+00	5.E-01	1.E+00	2.E-01	6.E-01
Heptachlor Epoxide	1.07E+00	1.60E+00	6.00E-01	2.74E+00	2.E+00	3.E+00	4.E-01	6.E-01
1,2,3,4,6,7,8-HpCDD	1.49E+01	4.82E+01	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDF	7.37E-01	2.14E+00	-	-	-	-	-	-
1,2,3,4,7,8,9-HpCDF	2.69E-02	7.04E-02	-	-	-	-	-	-
1,2,3,4,7,8-HxCDD	1.36E-01	4.63E-01	-	-	-	-	-	-
1,2,3,4,7,8-HxCDF	2.52E-02	6.72E-02	-	-	-	-	-	-
1,2,3,6,7,8-HxCDD	1.09E+00	3.90E+00	-	-	-	-	-	-
1,2,3,6,7,8-HxCDF	2.76E-02	8.02E-02	-	-	-	-	-	-
1,2,3,7,8,9-HxCDD	4.39E-01	1.58E+00	-	-	-	-	-	-
1,2,3,7,8,9-HxCDF	4.22E-03	8.80E-03	-	-	-	-	-	-
1,2,3,7,8-PeCDD	1.65E-01	6.46E-01	-	-	-	-	-	-
1,2,3,7,8-PeCDF	5.97E-03	1.66E-02	-	-	-	-	-	-
2,3,4,6,7,8-HxCDF	4.52E-02	1.25E-01	-	-	-	-	-	-
2,3,4,7,8-PeCDF	8.69E-03	2.42E-02	-	-	-	-	-	-
2,3,7,8-TCDD	3.80E-02	1.36E-01	1.02E+02**	-	4.E-04	1.E-03	-	-
2,3,7,8-TCDF	3.93E-03	1.17E-02	-	-	-	-	-	-
OCDD	1.06E+02	2.93E+02	-	-	-	-	-	-
OCDF	1.15E+00	3.99E+00	-	-	-	-	-	-
Aluminum	6.91E+03	9.14E+03	1.40E+04	-	5.E-01	7.E-01	-	-
Antimony	1.18E+00	7.85E+00	6.40E+01	-	2.E-02	1.E-01	-	-
Arsenic	1.94E+00	3.10E+00	5.90E+00	1.70E+01	3.E-01	5.E-01	1.E-01	2.E-01
Barium	6.01E+01	1.04E+02	2.00E+01	-	3.E+00	5.E+00	-	-
Beryllium	2.97E-01	5.50E-01	-	-	-	-	-	-
Cadmium	5.89E+00	1.24E+01	6.00E-01	3.50E+00	1.E+01	2.1E+01	2.E+00	4.E+00
Chromium	4.24E+03	1.01E+04	3.73E+01	9.00E+01	1.1E+02	2.7E+02	4.7E+01	1.1E+02
Cobalt	8.12E+00	9.80E+00	-	-	-	-	-	-
Copper	2.46E+01	3.91E+01	3.57E+01	1.97E+02	7.E-01	1.E+00	1.E-01	2.E-01
Cyanide	2.64E-01	3.80E-01	1.00E-01	-	3.E+00	4.E+00	-	-

Table 17. Risk Summary for Sediment COCs – Pownal Tannery Study Area

COC	Concentration (ug/kg)*		Chronic TRV (ug/kg)***	Acute TRV (ug/kg)****	Chronic ESQs		Acute ESQs	
	Mean	Maximum			Mean	Maximum	Mean	Maximum
Iron	1.55E+04	1.93E+04	2.00E+04	4.00E+04	8.E-01	1.E+00	4.E-01	5.E-01
Lead	1.57E+02	3.52E+02	3.50E+01	9.13E+01	4.E+00	1.0E+01	2.E+00	4.E+00
Manganese	6.63E+02	1.09E+03	4.60E+02	1.10E+03	1.E+00	2.E+00	6.E-01	1.E+00
Mercury	1.53E+00	3.65E+00	1.74E-01	4.86E-01	9.E+00	2.1E+01	3.E+00	8.E+00
Nickel	1.46E+01	2.25E+01	1.80E+01	3.59E+01	8.E-01	1.E+00	4.E-01	6.E-01
Selenium	4.02E-01	7.60E-01	1.00E-01	-	4.E+00	8.E+00	-	-
Silver	5.78E-01	1.75E+00	4.50E+00	-	1.E-01	4.E-01	-	-
Thallim	1.30E-01	1.30E-01	-	-	-	-	-	-
Vanadium	1.08E+01	1.45E+01	-	-	-	-	-	-
Zinc	9.99E+01	1.80E+02	1.23E+02	3.15E+02	8.E-01	1.E+00	3.E-01	6.E-01
				TOTAL ESQs	3.6E+02	2.0E+03	6.9E+01	2.2E+02
Landfill Pond								
Acetone	1.09E+02	2.40E+02	7.00E+01**	-	2.E+00	3.E+00	-	-
2-Butanone	8.36E+01	3.23E+02	1.32E+03**	2.29E+04**	6.E-02	2.E-01	4.E-03	1.E-02
Toluene	2.90E+01	1.17E+02	2.45E+02**	2.94E+03**	1.E-01	5.E-01	1.E-02	4.E-02
4-Methylphenol	4.26E+02	6.80E+02	6.70E+02	-	6.E-01	1.E+00	-	-
Acenaphthylene	1.00E+02	1.00E+02	see total PAHs	see total PAHs	-	-	-	-
Anthracene	9.00E+01	9.00E+01	see total PAHs	see total PAHs	-	-	-	-
Benzaldehyde	3.33E+02	6.70E+02	-	-	-	-	-	-
Benzo(a)anthracene	2.21E+02	4.10E+02	see total PAHs	see total PAHs	-	-	-	-
Benzo(a)pyrene	2.43E+02	5.00E+02	see total PAHs	see total PAHs	-	-	-	-
Benzo(b)fluoranthene	2.20E+02	3.70E+02	see total PAHs	see total PAHs	-	-	-	-
Benzo(k)fluoroanthene	2.64E+02	5.40E+02	see total PAHs	see total PAHs	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.93E+02	2.20E+02	4.36E+06**	-	4.E-05	5.E-05	-	-
Chrysene	2.62E+02	4.80E+02	see total PAHs	see total PAHs	-	-	-	-
Dibenzo(a,h)anthracene	8.60E+01	8.60E+01	see total PAHs	see total PAHs	-	-	-	-
Fluoranthene	3.17E+02	6.50E+02	1.42E+04**	see total PAHs	2.E-02	5.E-02	-	-
Indeno(1,2,3-cd)pyrene	1.63E+02	3.50E+02	see total PAHs	see total PAHs	-	-	-	-
Phenanthrene	2.02E+02	3.30E+02	4.17E+03**	see total PAHs	5.E-02	8.E-02	-	-
Pyrene	4.34E+02	7.20E+02	see total PAHs	see total PAHs	-	-	-	-
Total PAHs	2.60E+03	4.63E+03	1.42E+04**	8.82E+04**	2.E-01	3.E-01	3.E-02	5.E-02
4,4-DDD	4.42E+00	8.40E+00	3.54E+00	8.51E+00	1.E+00	2.E+00	5.E-01	1.E+00
4,4-DDE	7.68E+00	1.10E+01	1.42E+00	6.75E+00	5.E+00	8.E+00	1.E+00	2.E+00
Aldrin	2.14E+00	5.10E+00	2.00E+00	3.92E+02**	1.E+00	3.E+00	5.E-03	1.E-02
alpha-BHC	2.11E+00	2.75E+00	6.00E+00	4.90E+02**	4.E-01	5.E-01	4.E-03	6.E-03

Table 17. Risk Summary for Sediment COCs – Pownal Tannery Study Area

COC	Concentration (ug/kg)*		Chronic TRV (ug/kg)***	Acute TRV (ug/kg)****	Chronic ESQs		Acute ESQs	
	Mean	Maximum			Mean	Maximum	Mean	Maximum
alpha-Chlordane	9.15E-01	9.15E-01	4.50E+00	8.90E+00	2.E-01	2.E-01	1.E-01	1.E-01
Aroclor 1242	1.40E+02	1.60E+02	8.33E+02**	1.90E+04**	2.E-01	2.E-01	7.E-03	8.E-03
Aroclor 1254	1.30E+02	1.60E+02	3.97E+03**	7.20E+04**	3.E-02	4.E-02	2.E-03	2.E-03
beta-BHC	1.69E+00	1.80E+00	5.00E+00	1.03E+03**	3.E-01	4.E-01	2.E-03	2.E-03
delta-BHC	1.70E+00	2.40E+00	5.88E+02**	-	3.E-03	4.E-03	-	-
Dieldrin	3.59E+00	4.40E+00	2.55E+02**	-	1.E-02	2.E-02	-	-
Endosulfan Sulfate	2.91E+00	3.60E+00	2.70E+01**	-	1.E-01	1.E-01	-	-
Endrin Aldehyde	2.75E+00	3.90E+00	2.67E+00	6.24E+01	1.E+00	1.E+00	4.E-02	6.E-02
gamma-Chlordane	2.04E+00	2.90E+00	4.50E+00	8.90E+00	5.E-01	6.E-01	2.E-01	3.E-01
Heptachlor	1.81E+00	2.15E+00	3.33E+02**	6.13E+03**	5.E-03	6.E-03	3.E-04	4.E-04
1,2,3,4,6,7,8-HpCDD	4.40E-01	8.60E-01	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDF	7.12E-02	1.24E-01	-	-	-	-	-	-
1,2,3,4,7,8,9-HpCDF	5.13E-03	8.30E-03	-	-	-	-	-	-
1,2,3,4,7,8-HxCDD	3.88E-03	8.43E-03	-	-	-	-	-	-
1,2,3,4,7,8-HxCDF	6.67E-03	1.01E-02	-	-	-	-	-	-
1,2,3,6,7,8-HxCDD	1.75E-02	3.39E-02	-	-	-	-	-	-
1,2,3,6,7,8-HxCDF	6.18E-03	8.71E-03	-	-	-	-	-	-
1,2,3,7,8,9-HxCDD	8.58E-03	1.87E-02	-	-	-	-	-	-
1,2,3,7,8,9-HxCDF	1.59E-03	2.08E-03	-	-	-	-	-	-
1,2,3,7,8-PeCDD	1.74E-03	3.45E-03	-	-	-	-	-	-
1,2,3,7,8-PeCDF	3.85E-03	5.15E-03	-	-	-	-	-	-
2,3,4,6,7,8-HxCDF	6.20E-03	9.27E-03	-	-	-	-	-	-
2,3,4,7,8-PeCDF	6.52E-03	9.20E-03	-	-	-	-	-	-
2,3,7,8-TCDD	6.30E-04	1.04E-03	5.00E+02**	-	1.E-06	2.E-06	-	-
2,3,7,8-TCDF	1.25E-02	1.97E-02	-	-	-	-	-	-
OCDD	3.59E+00	6.78E+00	-	-	-	-	-	-
OCDF	2.01E-01	4.09E-01	-	-	-	-	-	-
Aluminum	1.01E+04	1.40E+04	1.40E+04	-	7.E-01	1.E+00	-	-
Arsenic	5.47E+00	5.90E+00	5.90E+00	1.70E+01	9.E-01	1.E+00	3.E-01	3.E-01
Barium	7.09E+01	8.14E+01	2.00E+01	-	4.E+00	4.E+00	-	-
Beryllium	4.12E-01	5.40E-01	-	-	-	-	-	-
Cadmium	2.34E+00	3.20E+00	6.00E-01	3.50E+00	4.E+00	5.E+00	7.E-01	9.E-01
Chromium	9.06E+01	1.08E+02	3.73E+01	9.00E+01	2.E+00	3.E+00	1.E+00	1.E+00
Cobalt	1.22E+01	1.32E+01	-	-	-	-	-	-
Copper	4.26E+01	5.26E+01	3.57E+01	1.97E+02	1.E+00	1.E+00	2.E-01	3.E-01

Table 17. Risk Summary for Sediment COCs – Pownal Tannery Study Area

COC	Concentration (ug/kg)*		Chronic TRV (ug/kg)***	Acute TRV (ug/kg)****	Chronic ESQs		Acute ESQs	
	Mean	Maximum			Mean	Maximum	Mean	Maximum
Cyanide	3.17E-01	4.50E-01	1.00E-01	-	3.E+00	5.E+00	-	-
Iron	2.32E+04	2.92E+04	2.00E+04	4.00E+04	1.E+00	1.E+00	6.E-01	7.E-01
Lead	5.56E+01	6.35E+01	3.50E+01	9.13E+01	2.E+00	2.E+00	6.E-01	7.E-01
Manganese	6.08E+02	7.19E+02	4.60E+02	1.10E+03	1.E+00	2.E+00	6.E-01	7.E-01
Mercury	3.56E-01	5.15E-01	1.74E-01	4.86E-01	2.E+00	3.E+00	7.E-01	1.E+00
Nickel	2.14E+01	2.68E+01	1.80E+01	3.59E+01	1.E+00	1.E+00	6.E-01	7.E-01
Silver	3.40E+00	5.80E+00	4.50E+00	-	8.E-01	1.E+00	-	-
Thallium	1.55E-01	1.55E-01	-	-	-	-	-	-
Vanadium	1.34E+01	1.65E+01	-	-	-	-	-	-
Zinc	1.52E+02	1.97E+02	1.23E+02	3.15E+02	1.E+00	2.E+00	5.E-01	6.E-01
TOTAL ESQs					3.8E+01	5.4E+01	8.E+00	1.E+01
Halifax Hollow								
4-Chloroaniline	4.60E+02	4.60E+02	-	-	-	-	-	-
Benzo(g,h,i)perylene	5.00E+02	5.00E+02	see total PAHs	see total PAHs	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.10E+02	1.10E+02	1.74E+06**	-	6.E-05	6.E-05	-	-
Total PAHs	5.00E+02	5.00E+02	5.66E+03**	3.51E+04**	9.E-02	9.E-02	1.E-02	1.E-02
Aluminum	5.50E+03	5.50E+03	1.40E+04	-	4.E-01	4.E-01	-	-
Barium	2.26E+01	2.26E+01	2.00E+01	-	1.E+00	1.E+00	-	-
Chromium	6.40E+00	6.40E+00	3.73E+01	9.00E+01	2.E-01	2.E-01	7.E-02	7.E-02
Cobalt	6.90E+00	6.90E+00	-	-	-	-	-	-
Copper	1.42E+01	1.42E+01	3.57E+01	1.97E+02	4.E-01	4.E-01	7.E-02	7.E-02
Iron	1.13E+04	1.13E+04	2.00E+04	4.00E+04	6.E-01	6.E-01	3.E-01	3.E-01
Lead	6.20E+00	6.20E+00	3.50E+01	9.13E+01	2.E-01	2.E-01	7.E-02	7.E-02
Manganese	2.57E+02	2.57E+02	4.60E+02	1.10E+03	6.E-01	6.E-01	2.E-01	2.E-01
Nickel	1.18E+01	1.18E+01	1.80E+01	3.59E+01	7.E-01	7.E-01	3.E-01	3.E-01
Zinc	4.34E+01	4.34E+01	1.23E+02	3.15E+02	4.E-01	4.E-01	1.E-01	1.E-01
TOTAL ESQs					4.E+00	4.E+00	1.E+00	1.E+00

Notes:

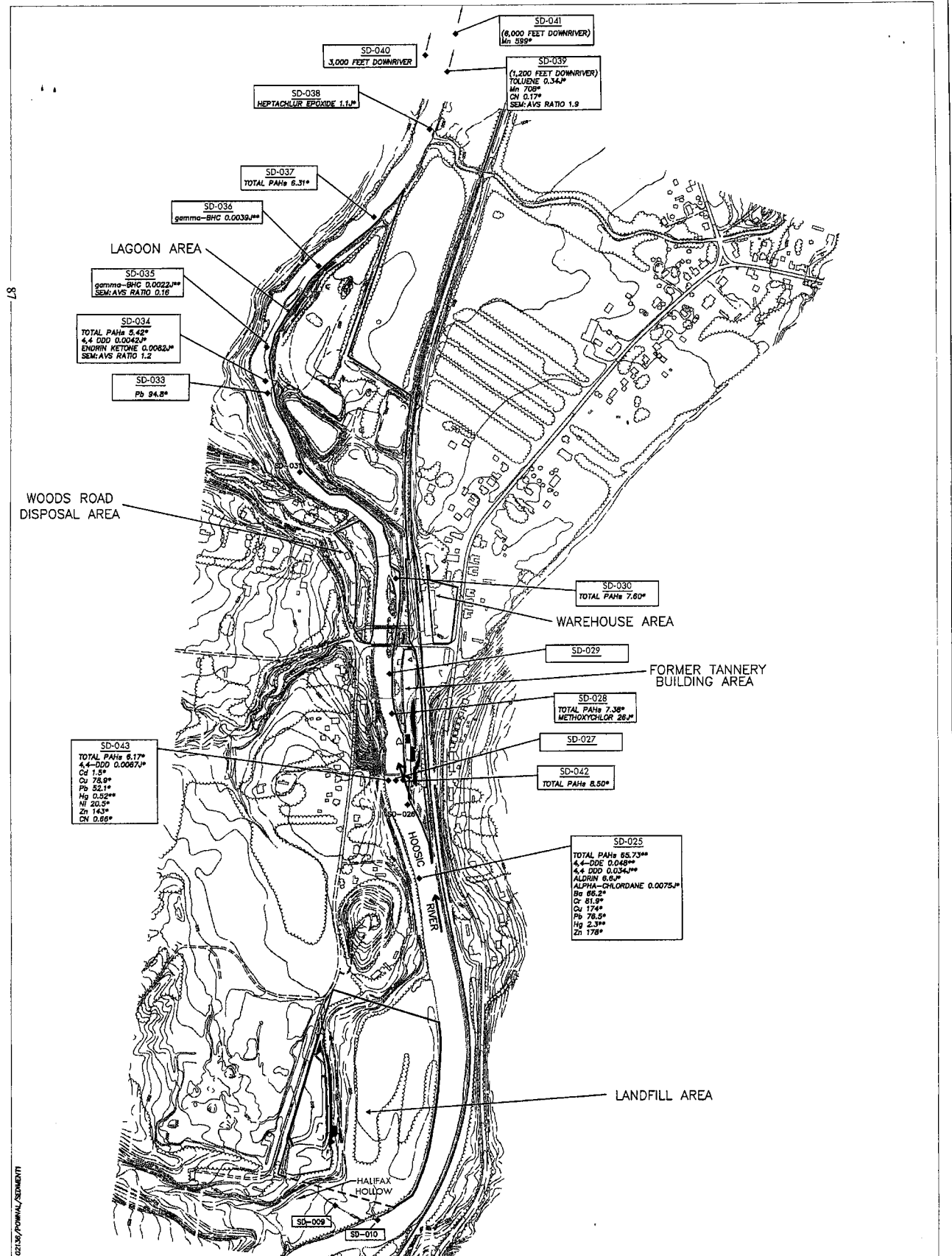
* Inorganic concentrations and inorganic TRVs presented in units of mg/kg.

** TRV for COCs using EqP approach dependent upon sediment TOC concentration. Average sediment TOC of each area as follows:
Hoosic River: 1.25% Landfill Pond: 4.9% Lagoons: assumed 1.0% Halifax Hollow: 1.95%

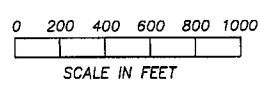
*** Chronic TRVs also include TELs, LELs, and TECs (see Table 12).

**** Acute TRVs also include PELs, SELs, and MECs (see Table 12).

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02136/POWNAL/SEDIMENT



- LEGEND
- TANNERY PROPERTY BOUNDARY
 - * ABOVE CHRONIC TRV
 - ** ABOVE ACUTE TRV
 - ◆ SEDIMENT SAMPLE LOCATION

TRC	Boott Mills South Foot of John Street Lowell, MA 01852 978-970-5600	FIGURE 12 HOOSIC RIVER SEDIMENT SAMPLING LOCATIONS WITH COC'S ABOVE TRVS AND BACKGROUND POWNA TANNERY POWNA, VERMONT
	TRC PROJ. NO.: 02136-0220-01N93	
	EPA CONTRACT NO.: 68-W6-0042	
	RAC SUBCONTRACTOR NO.: 107061	
M&E Metcalf & Eddy		

The total PAH concentration along the eastern bank immediately upgradient of the dam were also elevated above its lowest effect level TRV. The SEM:AVS ratios from sediment samples collected from the Hoosic River range from 0.16 to 1.9 indicating potential divalent metal bioavailability in portions of the river (see Figure 12).

The concentrations of total PAHs below the dam were elevated above its chronic threshold effect concentration at 4 of 13 samples. Several pesticides (4,4-DDD, endrin ketone, gamma-BHC, heptachlor epoxide and methoxychlor), toluene, cyanide, lead and manganese were also detected above chronic TRVs downgradient of the dam. Lead and gamma-BHC were detected above their respective acute TRVs. The SEM:AVS ratios within the portion of the Hoosic River located nearest the elevated lead level was above unity indicating potential bioavailability of lead at SD-033.

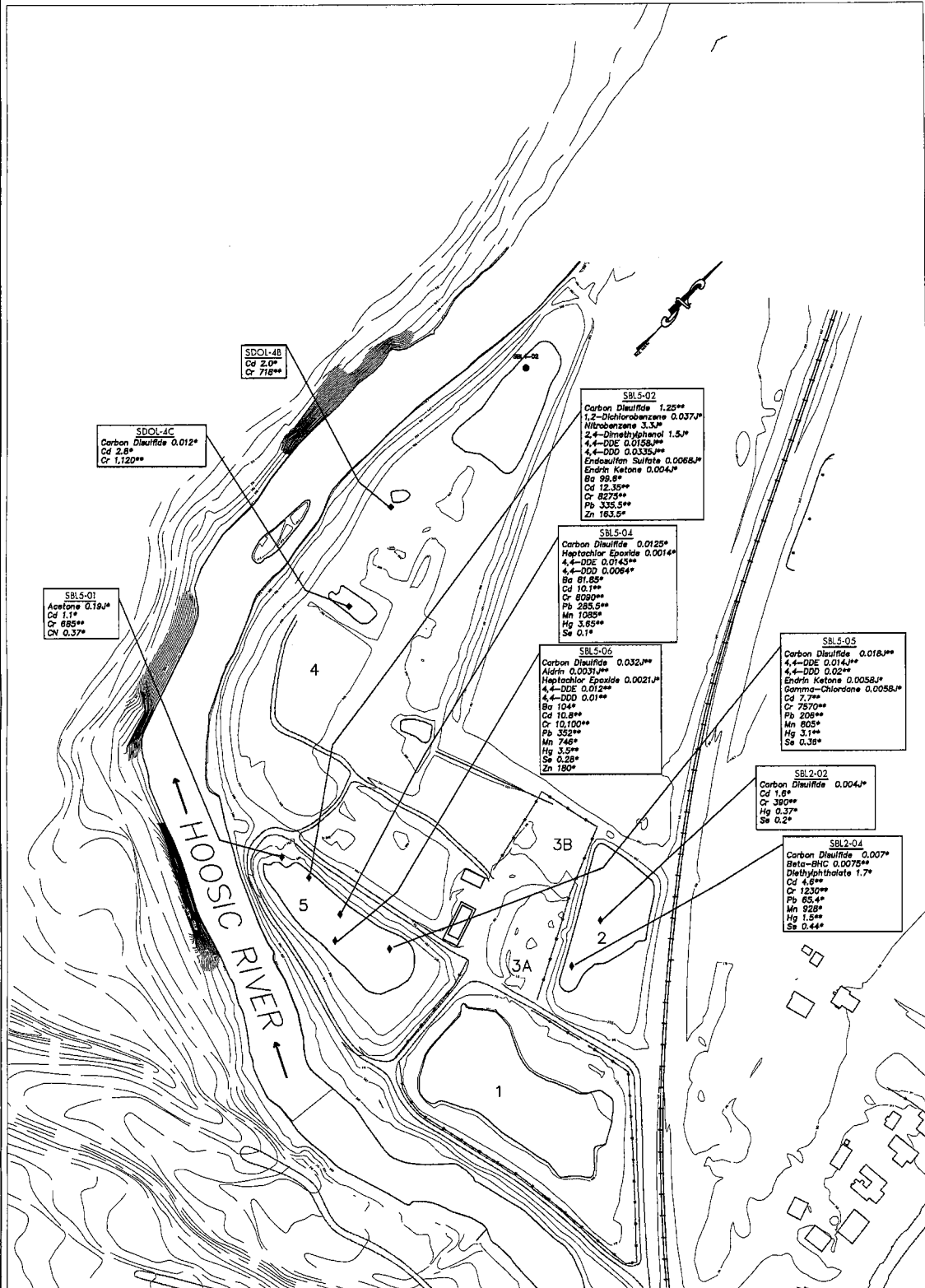
Concentrations of gamma-chlordane, barium, cadmium, chromium, and nickel detected in the upgradient reference Hoosic River samples were similar to concentrations detected adjacent or downgradient of the site (chronic ESQs were the same for the site sediments and the upgradient reference sediments). Overall, the distribution of pesticides, PAHs and inorganic contaminants of concern within the Hoosic River sediments do not appear to be clearly associated with the Pownal Tannery site. Concentrations of COCs are elevated substantially along the west bank of the Hoosic River above the North Pownal dam.

Lagoon Area

The mean and maximum acute ESQs are 69 and 220, respectively (see Table 17). The mean concentrations of one VOC (carbon disulfide), one pesticide (4,4-DDD), and four inorganics (cadmium, chromium, lead and mercury) were elevated above their respective acute TRVs. Chromium accounted for nearly 70 percent of the total mean acute risk. The maximum concentrations of two additional pesticides (4,4-DDE and gamma-BHC) also exceed their respective acute TRVs.

Mean and maximum chronic ESQs are 360 and 2000, respectively. A total of three VOCs (1,2-dichlorobenzene, acetone, and carbon disulfide), three SVOCs (2,4-dimethylphenol, diethylphthalate and nitrobenzene) nine pesticides (4,4-DDD, 4,4-DDE, aldrin, beta-BHC, endosulfan sulfate, endrin ketone, gamma-BHC, gamma-chlordane, and heptachlor epoxide), and 11 inorganics (barium, cadmium, chromium, copper, cyanide, lead, manganese, mercury, nickel, selenium and zinc) have mean or maximum concentrations that were above their respective chronic benchmarks. Carbon disulfide and chromium accounted for approximately 80 percent of the total mean risk.

The locations of chronic and acute TRV exceedences elevated above background sample concentrations (reference pond samples) for each lagoon sediment sample are presented in Figure 13. SEM:AVS analyses were not conducted for the lagoon sediment samples.



TRC

Boott Mills South
Foot of John Street
Lowell, MA 01852
978-970-5600

TRC PROJ. NO.: 02136-0220-01N93

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107081

FIGURE 13
LAGOON SEDIMENT
SAMPLING LOCATIONS
WITH COCs ABOVE
TRVS AND BACKGROUND
POWNAI TANNERY
POWNAI, VERMONT

M&E Metcalf & Eddy

Chromium was detected above its acute TRV at all nine sediment sample locations within the lagoons. Cadmium, lead, and mercury were detected at concentrations above the acute levels at four and five sample locations, respectively. Cadmium was detected above its chronic effect level at the remaining four sample locations. Although SEM:AVS analyses were not conducted for the lagoon sediments, the elevated levels of these metals (particularly chromium) indicate adverse effects to benthic organisms are possible.

Although detected above their respective chronic levels, concentrations of barium, copper, manganese, nickel, and zinc are either greater or similar to detected levels at the reference pond. Selenium, although not detected at the two reference pond samples, was detected at an elevated concentration (above lagoon concentrations) at the reference wetland location.

Pesticides, although detected above chronic levels (and occasionally above acute levels), were detected at relatively low concentrations (substantially below 0.1 mg/kg). Since the chronic TRVs for pesticides exceeding TRVs do not account for total organic carbon, it is unknown whether these COCs may be bioavailable to benthic biota.

Carbon disulfide was detected above its acute TRV at three sampling locations (all within Lagoon 5) and above its chronic TRV at four additional sample locations.

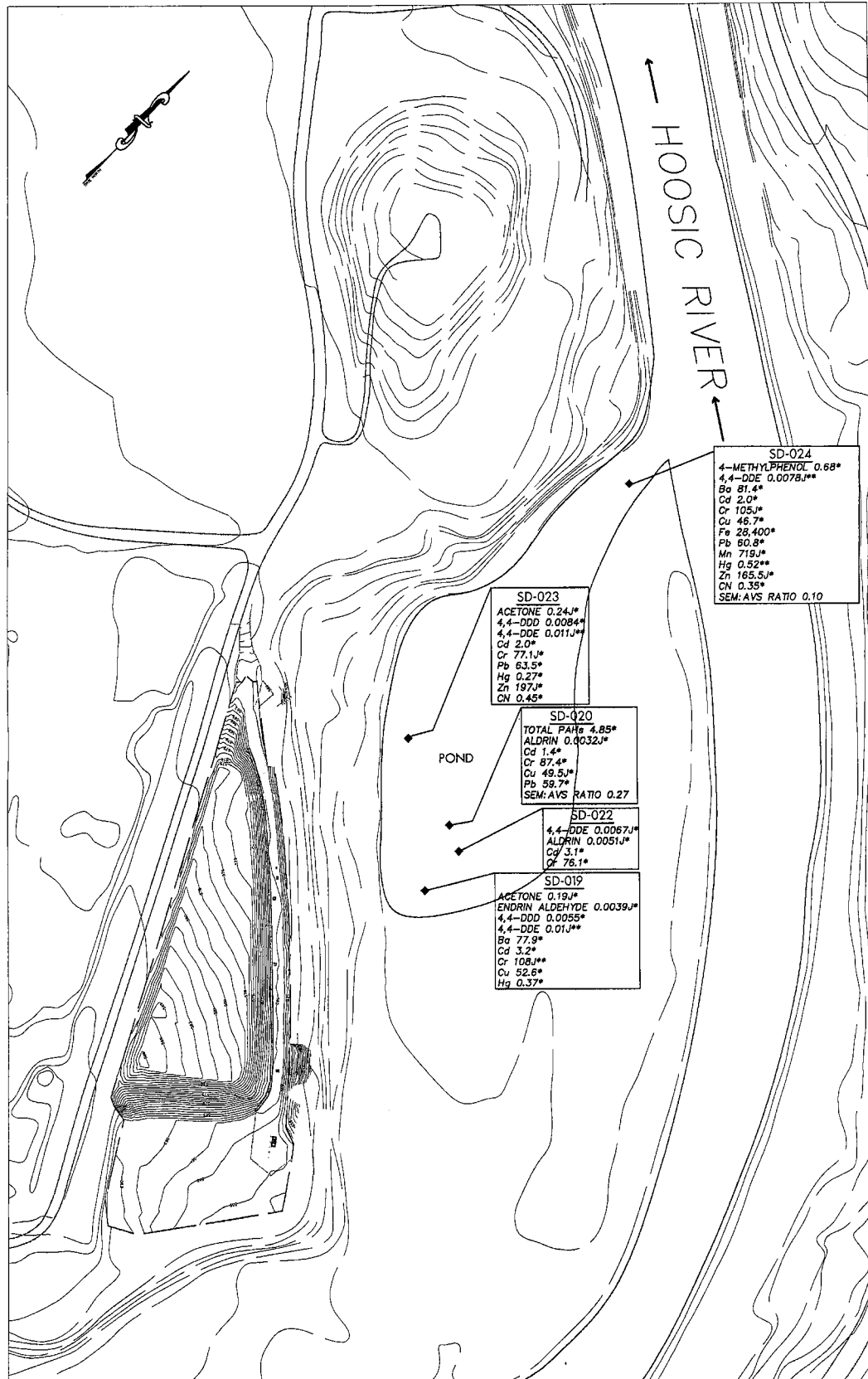
Landfill Pond

Mean and maximum acute ESQs are 8 and 10, respectively. The mean concentrations of the pesticide 4,4-DDE and chromium slightly exceed their respective acute TRV while the maximum detected concentration of mercury also exceeds its acute TRV. Mean or maximum concentrations of one VOC (acetone), one SVOC (4-methylphenol), four pesticides (4,4-DDD, 4,4-DDE, aldrin and endrin aldehyde), and 11 inorganics (barium, cadmium, chromium, copper, cyanide, iron, lead, manganese, mercury, nickel, silver and zinc) exceed their respective chronic TRVs.

For each landfill pond sediment sample, the locations of chronic and acute TRV exceedences that are also elevated above reference pond sample concentrations are presented in Figure 14. SEM:AVS ratios are also depicted in Figure 14.

The SEM:AVS ratios are less than unity for both of the landfill pond sediment samples where this analysis was conducted. The SEM:AVS ratio was 0.27 at SD-020 and 0.10 at SD-024. The low ratios indicate that divalent metals are unlikely to be bioavailable to benthic organisms. Therefore, impacts from these metals (i.e., cadmium, copper, lead, mercury, nickel and zinc) to the benthic invertebrate community are not anticipated.

In addition, concentrations of barium and iron were detected at similar concentrations within the reference pond and the landfill pond (chronic ESQs are the same for these inorganics in both the landfill and the reference ponds). Therefore, of the inorganics detected within the landfill pond sediments, only elevated concentrations of chromium, cyanide, manganese, and silver may potentially present a risk to benthic biota above background levels.



0 40 80 120 140
 SCALE IN FEET

LEGEND

- ◆ SEDIMENT SAMPLE LOCATION
- * ABOVE CHRONIC TRV
- ** ABOVE ACUTE TRV

TRC

Boott Mills South
 Foot of John Street
 Lowell, MA 01852
 978-970-5600

TRC PROJ. NO.: 02136-0220-01N93

EPA CONTRACT NO.: 68-W6-0042

RAC SUBCONTRACTOR NO.: 107081

FIGURE 14
 LANDFILL POND SEDIMENT
 SAMPLING LOCATIONS
 WITH COC'S ABOVE
 TRVS AND BACKGROUND
 POWNAL TANNERY
 POWNAL, VERMONT

M&E Metcalf & Eddy

Cyanide was elevated above its chronic TRV at two landfill pond sampling locations while manganese and silver were elevated above chronic TRVs at one location each. Chromium was elevated above its chronic TRV at all five sediment samples collected from the landfill pond and above its acute TRV at two locations. However, it is unknown whether the chromium detected in the landfill pond sediments is bioavailable as chromium also form insoluble sulfides (U.S. EPA, 1991b) and may be rendered biologically unavailable due to the elevated AVS detected in the landfill pond sediments. Since the chronic TRVs for pesticides do not account for total organic carbon, it is not known if the elevated concentrations of pesticides detected in the landfill pond sediments are bioavailable.

Halifax Hollow

Mean and maximum ESQs are both 1 with no individual contaminants having a concentration above its respective acute TRV. Barium was the only COC detected above its chronic TRV (ESQ is 1). However, as the upgradient Halifax Hollow sediment sample had a greater barium concentration, it is unlikely that barium presents a significant risk to benthic invertebrates above background concentrations.

4.4 Wildlife Measurement Receptors

Potential risks from the ingestion of surface water, sediment, surface soil and biota within the Pownal Tannery Study Area are evaluated by comparing the estimated exposure doses received by the indicator species with applicable chronic NOAEL and LOAEL toxicity values. Results of this analysis are presented by the area of concern (i.e., Hoosic River, lagoon area, landfill pond, and landfill wetland/seeps) with a discussion of results provided for each indicator species.

4.4.1 Hoosic River

The wildlife indicator species selected for the Hoosic River include the belted kingfisher, mink, Canada goose, muskrat, spotted sandpiper, little brown bat, mallard and raccoon. Risks for each of these species is summarized below. The concentrations of COCs providing risk are also discussed in relation to upgradient concentrations detected at the reference samples for the Hoosic River.

Belted Kingfisher

Risks to the piscivorous belted kingfisher from detected COC concentrations in Hoosic River surface water and sediments (as well as modeled concentrations in fish and aquatic invertebrates) are presented in Table 18. The total mean ESQs for the NOAEL and LOAEL TRVs are 8 and 0.8, respectively. The mean estimated exposure doses of 4,4-DDT, aroclor 1254 and zinc were the only COCs that resulted in a NOAEL ESQ above unity (ESQ for 4,4-DDT is 1 and ESQs for aroclor 1254 and zinc are each 2). However, the mean concentrations of 4,4-DDT, aroclor 1254 and zinc were greater in the upgradient Hoosic River sediment samples indicating that risk from these COCs within the entire portion of the Hoosic River adjacent and downgradient of the Pownal Tannery site is no greater than background levels of these contaminants. Maximum concentrations of several COCs (dioxin, chromium, copper, lead, zinc, aroclors 1242 and 1254

and bis(2-ethylhexyl)phthalate) are greater than maximum upgradient concentrations and provide ESQs at or greater than unity. However, as foraging is unlikely to be restricted to small portions of the river for any extended period of time, risks from these exceedences is not expected to be significant.

Mink

Risks to the piscivorous mink from modeled COC concentrations of fish, aquatic invertebrates, vegetation as well as from the ingestion of contaminants present in surface water and sediment are presented in Table 19. The total mean ESQs for the NOAEL and LOAEL TRVs are 12 and 1, respectively. Mean exposure doses of all COCs received by the mink were below the chronic LOAEL TRV. Estimated mean exposure doses of dioxin (ESQ is 1) and aluminum (ESQ is 8) were the only COCs to exceed the mink's chronic NOAEL TRV. However, upgradient concentrations of both aluminum and dioxin congeners (including furan congeners) were elevated above concentrations adjacent and downgradient of the Pownal Tannery site indicating risk from these COCs is no greater than background levels of these constituents. Although the maximum detected concentrations of dioxins (as well as aroclors 1242 and 1254 and high molecular weight PAHs) exceed upgradient concentrations and have ESQs above unity, it is unrealistic to assume that foraging would be restricted for a significant period of time in the vicinity of maximum detected concentrations.

Canada Goose

The total mean and maximum ESQs for both the NOAEL and LOAEL TRVs are less than unity (see Table 20). Therefore, it is unlikely that the Canada goose (and other herbivorous birds) would be at risk from the detected concentrations of COCs within the sediments of the Hoosic River.

Muskrat

Risks to the herbivorous muskrat from detected COC concentrations in Hoosic River surface water and sediments (as well as modeled concentrations in aquatic vegetation) are presented in Table 21. The total mean ESQs for the NOAEL and LOAEL TRVs are 29 and 3, respectively. The only COC having an ESQ above unity is aluminum. However, both the mean and maximum aluminum concentrations are greater within the upgradient Hoosic River sediment samples indicating no increased risk from aluminum than attributable to background concentrations.

Table 18. Belted Kingfisher Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	5.85E-06	5.46E-05	4.E-01	4.E+00	4.E-02	4.E-01
Aluminum	109.7	-	3.21E+01	5.08E+01	3.E-01	5.E-01	-	-
Arsenic	5.14	12.84	6.65E-02	2.05E-01	1.E-02	4.E-02	5.E-03	2.E-02
Barium	20.8	41.7	1.98E-01	5.59E-01	1.E-02	3.E-02	5.E-03	1.E-02
Beryllium	-	-	9.36E-03	2.36E-02	-	-	-	-
Cadmium	1.4	14	1.01E-01	6.14E-01	7.E-02	4.E-01	7.E-03	4.E-02
Chromium	1	5	4.15E-01	1.97E+00	4.E-01	2.E+00	8.E-02	4.E-01
Chromium(Hexavalent)	-	-	3.91E-03	3.91E-03	-	-	-	-
Cobalt	-	-	9.53E-02	1.46E-01	-	-	-	-
Copper	47	61.7	6.86E+00	4.70E+01	1.E-01	1.E+00	1.E-01	8.E-01
Cyanide	0.04	-	0.00E+00	0.00E+00	0.E+00	0.E+00	-	-
Iron	-	-	5.24E+01	7.79E+01	-	-	-	-
Lead	1.13	11.3	7.26E-01	2.95E+00	6.E-01	3.E+00	6.E-02	3.E-01
Manganese	977	-	4.95E+00	8.31E+00	5.E-03	9.E-03	-	-
Mercury	0.45	0.9	3.99E-02	3.38E-01	9.E-02	8.E-01	4.E-02	4.E-01
Nickel	77.4	107	1.37E+00	2.44E+00	2.E-02	3.E-02	1.E-02	2.E-02
Silver	178	-	2.58E-01	1.81E+00	1.E-03	1.E-02	-	-
Thallium	0.35	-	7.69E-03	7.69E-03	2.E-02	2.E-02	-	-
Vanadium	11.4	-	2.38E-02	4.51E-02	2.E-03	4.E-03	-	-
Zinc	14.5	131	2.62E+01	6.87E+01	2.E+00	5.E+00	2.E-01	5.E-01
4,4'-DDD	-	-	3.53E-03	2.97E-02	-	-	-	-
4,4'-DDE	0.845	-	1.58E-02	1.53E-01	2.E-02	2.E-01	-	-
4,4'-DDT	0.0028	-	2.99E-03	8.97E-03	1.E+00	3.E+00	-	-
Aldrin	0.061	-	1.69E-03	7.90E-03	3.E-02	1.E-01	-	-
alpha-BHC	0.56	2.25	1.58E-03	5.24E-03	3.E-03	9.E-03	7.E-04	2.E-03
alpha-Chlordane	2.14	10.7	2.96E-03	1.62E-02	1.E-03	8.E-03	3.E-04	2.E-03
Aroclor 1242	0.41	-	1.41E-01	6.90E-01	3.E-01	2.E+00	-	-
Aroclor 1254	0.18	1.8	3.61E-01	3.22E+00	2.E+00	1.8E+01	2.E-01	2.E+00
Aroclor 1260	2.16	-	1.95E-01	1.03E+00	9.E-02	5.E-01	-	-
delta-BHC	0.56	2.25	1.17E-03	1.92E-03	2.E-03	3.E-03	5.E-04	9.E-04
Dieldrin	0.077	-	2.28E-03	4.13E-03	3.E-02	5.E-02	-	-
Endosulfan sulfate	10	-	2.60E-03	6.03E-03	3.E-04	6.E-04	-	-
Endrin	0.3	-	3.62E-03	1.68E-02	1.E-02	6.E-02	-	-
Endrin ketone	0.3	-	2.79E-03	9.86E-03	9.E-03	3.E-02	-	-
gamma-BHC (Lindane)	2	20	1.30E-03	4.08E-03	7.E-04	2.E-03	7.E-05	2.E-04

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
gamma-Chlordane	2.14	10.7	2.23E-03	8.16E-03	1.E-03	4.E-03	2.E-04	8.E-04
Heptachlor	65	-	1.35E-03	2.96E-03	2.E-05	5.E-05	-	-
Heptachlor epoxide	65	-	9.89E-04	1.04E-03	2E-05	2.E-05	-	-
Methoxychlor	-	-	1.25E-02	2.43E-02	-	-	-	-
2-Methylnaphthalene	see LMW PAHs	see LMW PAHs	5.56E-02	5.56E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
4-Methylphenol	-	-	2.01E-01	2.08E-01	-	-	-	-
Acenaphthene	see LMW PAHs	see LMW PAHs	9.11E-02	9.11E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Acenaphthylene	see LMW PAHs	see LMW PAHs	1.00E-01	4.47E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	1.86E-01	1.77E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	1.31E-01	1.31E-01	-	-	-	-
Benzo(a)anthracene	-	-	4.68E-01	4.28E+00	-	-	-	-
Benzo(a)pyrene	-	-	5.21E-01	5.56E+00	-	-	-	-
Benzo(b)fluoranthene	-	-	4.11E-01	3.25E+00	-	-	-	-
Benzo(g,h,i)perylene	-	-	1.90E-01	1.11E+00	-	-	-	-
Benzo(k)fluoranthene	-	-	3.77E-01	2.91E+00	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	2.01E-01	2.12E+00	2.E-01	2.E+00	-	-
Carbazole	-	-	1.84E-01	1.84E-01	-	-	-	-
Chrysene	-	-	4.88E-01	4.20E+00	-	-	-	-
Dibenzo(a,h)anthracene	-	-	1.36E-01	8.33E-01	-	-	-	-
Dibenzofuran	see LMW PAHs	see LMW PAHs	1.74E-01	4.42E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Diethylphthalate	-	-	2.00E-01	2.83E-02	-	-	-	-
Di-n-butylphthalate	0.11	1.1	6.21E-02	6.21E-02	6.E-01	6.E-01	6.E-02	6.E-02
Fluoranthene	-	-	7.19E-01	5.99E+00	-	-	-	-
Fluorene	see LMW PAHs	see LMW PAHs	1.09E-01	5.03E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Indeno(1,2,3-cd)pyrene	-	-	2.69E-01	2.33E+00	-	-	-	-
Naphthalene	see LMW PAHs	see LMW PAHs	7.25E-02	7.25E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pentachlorophenol	44	88	1.86E-01	1.86E-01	4.E-03	4.E-03	2.E-03	2.E-03
Phenanthrene	see LMW PAHs	see LMW PAHs	6.20E-01	6.55E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	9.32E-01	9.84E+00	-	-	-	-
Low Molecular Weight PAHs	40	400	1.35E+00	9.48E+00	3.E-02	2.E-01	3.E-03	2.E-02
Acetone	52	-	5.33E-03	5.33E-03	1.E-04	1.E-04	-	-
Methylene chloride	-	-	2.09E-03	2.45E-03	-	-	-	-
Toluene	-	-	1.48E-02	2.41E-01	-	-	-	-
TOTAL ESQS					8.E+00	4.2E+01	8.E-01	5.E+00

Table 19. Mink Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	1.01E-06	1.06E-05	1.E+00	1.1E+01	1.E-01	1.E+00
Aluminum	1.93	19.3	1.62E+01	2.56E+01	8.E+00	1.3E+01	8.E-01	1.E+00
Arsenic	4.6	9.3	1.34E-02	4.14E-02	3.E-03	9.E-03	1.E-03	4.E-03
Barium	5.1	-	8.43E-02	2.34E-01	2.E-02	5.E-02	-	-
Beryllium	0.66	-	1.65E-03	4.15E-03	3.E-03	6.E-03	-	-
Cadmium	1	10	1.47E-02	8.92E-02	1.E-02	9.E-02	1.E-03	9.E-03
Chromium	2737	-	9.63E-02	4.55E-01	4.E-05	2.E-04	-	-
Cobalt	-	-	2.74E-02	4.20E-02	-	-	-	-
Copper	11.7	15.14	1.09E+00	7.08E+00	9.E-02	6.E-01	7.E-02	5.E-01
Cyanide	24	-	3.49E-04	1.45E-03	1.E-05	6.E-05	-	-
Iron	-	-	3.62E+01	5.37E+01	-	-	-	-
Lead	8	80	1.53E-01	6.21E-01	2.E-02	8.E-02	2.E-03	8.E-03
Manganese	88	284	2.86E+00	4.64E+00	3.E-02	5.E-02	1.E-02	2.E-02
Mercury	1	-	6.22E-03	5.27E-02	6.E-03	5.E-02	-	-
Nickel	53.5	107	2.16E-01	3.85E-01	4.E-03	7.E-03	2.E-03	4.E-03
Silver	0.375	3.75	3.67E-02	2.57E-01	1.E-01	7.E-01	1.E-02	7.E-02
Thallium	0.0131	-	1.40E-03	1.40E-03	1.E-01	1.E-01	-	-
Vanadium	0.5	5	1.50E-02	2.83E-02	3.E-02	6.E-02	3.E-03	6.E-03
Zinc	200	410	3.82E+00	1.00E+01	2.E-02	5.E-02	9.E-03	2.E-02
4,4'-DDD	-	-	6.67E-04	5.60E-03	-	-	-	-
4,4'-DDE	1	-	7.80E-03	7.54E-02	8.E-03	8.E-02	-	-
4,4'-DDT	0.8	4	9.91E-04	2.97E-03	1.E-03	4.E-03	2.E-04	7.E-04
Aldrin	0.2	1	6.43E-04	2.85E-03	3.E-02	1.E-02	6.E-04	3.E-03
alpha-BHC	0.014	0.14	6.30E-04	2.08E-03	5.E-02	1.E-01	5.E-03	1.E-02
alpha-Chlordane	4.6	9.2	1.37E-03	7.49E-03	3.E-04	2.E-03	1.E-04	8.E-04
Aroclor 1242	0.069	-	2.96E-02	1.45E-01	4.E-01	2.E+00	-	-
Aroclor 1254	0.14	0.69	7.59E-02	6.78E-01	5.E-01	5.E+00	1.E-01	1.E+00
Aroclor 1260	-	-	4.11E-02	2.18E-01	-	-	-	-
delta-BHC	0.014	0.14	4.51E-04	7.45E-04	3.E-02	5.E-02	3.E-03	5.E-03
Dieldrin	0.02	0.2	9.18E-04	1.66E-03	5.E-02	8.E-02	5.E-03	8.E-03
Endosulfan sulfate	0.15	-	1.04E-03	2.40E-03	7.E-03	2.E-02	-	-
Endrin	0.092	0.92	1.30E-03	6.06E-03	1.E-02	7.E-02	1.E-03	7.E-03
Endrin ketone	0.092	0.92	1.00E-03	3.55E-03	1.E-02	4.E-02	1.E-03	4.E-03
gamma-BHC (Lindane)	8	-	5.09E-04	1.60E-03	6.E-05	2.E-04	-	-
gamma-Chlordane	4.6	9.2	7.58E-04	2.77E-03	2.E-04	6.E-04	8.E-05	3.E-04

Table 19. Mink Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Heptachlor	0.1	1	5.14E-04	1.13E-03	5.E-03	1.E-02	5.E-04	1.E-03
Heptachlor epoxide	0.1	1	4.16E-04	4.36E-04	4.E-03	4.E-03	4.E-02	4.E-02
Methoxychlor	100	200	4.69E-03	1.10E-02	5.E-05	1.E-04	2.E-05	6.E-05
2-Methynaphthalene	see LMW PAHs	see LMW PAHs	1.80E-02	1.80E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
4-Methylphenol	219.2	-	7.38E-02	7.67E-02	3.E-04	3.E-04	-	-
Acenaphthene	see LMW PAHs	see LMW PAHs	1.94E-02	1.94E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Acenaphthylene	see LMW PAHs	see LMW PAHs	2.17E-02	9.67E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	3.85E-02	3.67E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	0.47	-	4.96E-02	4.96E-02	1.E-01	1.E-01	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	9.16E-02	8.37E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	9.99E-02	1.06E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	7.87E-02	6.22E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(g,h,i)perylene	see HMW PAHs	see HMW PAHs	3.56E-02	2.08E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	7.22E-02	5.57E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-ethylhexyl)phthalate	18.3	183.3	6.44E-02	6.81E-01	4.E-03	4.E-02	4.E-04	4.E-03
Carbazole	5	-	5.83E-02	5.83E-02	1.E-02	1.E-02	-	-
Chrysene	see HMW PAHs	see HMW PAHs	9.55E-02	8.22E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Dibenzo(a,h)anthracene	see HMW PAHs	see HMW PAHs	2.51E-02	1.55E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Dibenzofuran	see LMW PAHs	see LMW PAHs	9.24E-03	9.24E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Diethylphthalate	4583	-	1.00E-02	1.00E-02	2.E-06	2.E-06	-	-
Di-n-butylphthalate	550	1833	1.78E-02	1.78E-02	3.E-05	3.E-05	1.E-05	1.E-05
Fluoranthene	see HMW PAHs	see HMW PAHs	1.46E-01	1.21E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluorene	see LMW PAHs	see LMW PAHs	2.29E-02	1.06E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	5.04E-02	4.37E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Naphthalene	see LMW PAHs	see LMW PAHs	1.59E-02	1.59E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pentachlorophenol	4	13	5.55E-02	5.55E-02	1.E-02	1.E-02	4.E-03	4.E-03
Phenanthrene	see LMW PAHs	see LMW PAHs	1.29E-01	1.36E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	1.89E-01	2.00E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	2.57E-01	1.97E+00	5.E-02	4.E-01	5.E-03	4.E-02
High Molecular Weight PAHs	1	10	8.84E-01	7.91E+00	9.E-01	8.E+00	9.E-02	8.E-01
Acetone	10	50	2.34E-03	2.34E-03	2.E-04	2.E-04	5.E-05	5.E-05
Methylene chloride	5.85	50	8.10E-04	9.40E-04	1.E-04	2.E-04	2.E-05	2.E-05
Toluene	26	260	5.18E-03	8.40E-02	2.E-04	3.E-03	2.E-05	3.E-04
TOTAL ESQS					1.2E+01	4.2E+01	1.E+00	5.E+00

Table 20. Canada Goose Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	1.93E-08	7.34E-08	1.E-03	5.E-03	1.E-04	5.E-04
Aluminum	109.7	-	2.89E+00	4.56E+00	3.E-02	4.E-02	-	-
Arsenic	5.14	12.84	1.06E-03	3.28E-03	2.E-04	6.E-04	8.E-05	3.E-04
Barium	20.8	41.7	1.42E-02	4.19E-02	7.E-04	2.E-03	3.E-04	1.E-03
Beryllium	-	-	8.45E-05	2.13E-04	-	-	-	-
Cadmium	1.4	14	2.16E-04	1.31E-03	2.E-04	9.E-04	2.E-05	9.E-05
Chromium	1	5	9.42E-03	4.47E-02	9.E-03	4.E-02	2.E-03	9.E-03
Cobalt	-	-	3.54E-03	5.42E-03	-	-	-	-
Copper	47	61.7	1.95E-02	1.36E-01	4.E-04	3.E-03	3.E-04	2.E-03
Cyanide	0.04	-	1.63E-03	3.57E-04	4.E-02	9.E-03	-	-
Iron	-	-	7.07E+00	1.04E+01	-	-	-	-
Lead	1.13	11.3	1.33E-02	5.39E-02	1.E-02	5.E-02	1.E-03	5.E-03
Manganese	977	-	2.18E-01	4.91E-01	2.E-04	5.E-04	-	-
Mercury	0.45	0.9	2.95E-04	2.50E-03	7.E-04	6.E-03	3.E-04	3.E-03
Nickel	77.4	107	6.65E-03	1.18E-02	9.E-05	2.E-04	6.E-05	1.E-04
Silver	178	-	2.57E-04	1.80E-03	1.E-06	1.E-05	-	-
Thallium	0.35	-	8.15E-05	8.15E-05	2.E-04	2.E-04	-	-
Vanadium	11.4	-	2.90E-03	5.50E-03	3.E-04	5.E-04	-	-
Zinc	14.5	131	9.84E-02	2.58E-01	7.E-03	2.E-02	8.E-04	2.E-03
4,4'-DDD	-	-	2.22E-06	1.86E-05	-	-	-	-
4,4'-DDE	0.845	-	2.70E-06	2.61E-05	3.E-06	3.E-05	-	-
4,4'-DDT	0.0028	-	1.28E-06	3.83E-06	5.E-04	1.E-03	-	-
Aldrin	0.061	-	7.35E-07	3.71E-06	1.E-05	6.E-05	-	-
alpha-BHC	0.56	2.25	1.09E-06	3.61E-06	2.E-06	6.E-06	5.E-07	2.E-06
alpha-Chlordane	2.14	10.7	7.55E-07	4.12E-06	4.E-07	2.E-06	7.E-08	4.E-07
Aroclor 1242	0.41	-	2.35E-05	1.15E-04	6.E-05	3.E-04	-	-
Aroclor 1254	0.18	1.8	5.17E-05	4.61E-04	3.E-04	3.E-03	3.E-05	3.E-04
Aroclor 1260	2.16	-	2.77E-05	1.47E-04	1.E-05	7.E-05	-	-
Delta-BHC	0.56	2.25	6.94E-07	2.61E-06	1.E-06	5.E-06	3.E-07	1.E-06
Dieldrin	0.077	-	1.73E-05	3.13E-06	2.E-04	4.E-05	-	-
Endosulfan sulfate	10	-	1.83E-06	4.25E-06	2.E-07	4.E-07	-	-
Endrin	0.3	-	1.69E-06	7.85E-06	6.E-06	3.E-05	-	-
Endrin ketone	0.3	-	1.35E-06	4.76E-06	5.E-06	2.E-05	-	-
gamma-BHC (Lindane)	2	20	8.33E-07	2.62E-06	4.E-07	1.E-06	4.E-08	1.E-07

Table 20. Canada Goose Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
gamma-Chlordane	2.14	10.7	7.43E-07	2.71E-06	3.E-07	1.E-06	7.E-08	3.E-07
Heptachlor	65	-	7.49E-07	1.64E-06	1.E-08	3.E-08	-	-
Heptachlor epoxide	65	-	1.25E-06	1.31E-06	2.E-08	2.E-08	-	-
Methoxychlor	-	-	6.54E-06	1.53E-05	-	-	-	-
2-Methylnaphthalene	see LMW PAHs	see LMW PAHs	4.68E-05	4.68E-05	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
4-Methylphenol	-	-	7.21E-04	7.49E-04	-	-	-	-
Acenaphthene	see LMW PAHs	see LMW PAHs	9.88E-05	9.88E-05	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Acenaphthylene	see LMW PAHs	see LMW PAHs	1.23E-04	5.48E-04	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	1.71E-04	1.63E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	8.01E-04	8.01E-04	-	-	-	-
Benzo(a)anthracene	-	-	3.28E-04	3.00E-03	-	-	-	-
Benzo(a)pyrene	-	-	3.35E-04	3.57E-03	-	-	-	-
Benzo(b)fluoranthene	-	-	2.64E-04	2.08E-03	-	-	-	-
Benzo(g,h,i)perylene	-	-	1.12E-04	6.54E-04	-	-	-	-
Benzo(k)fluoranthene	-	-	2.42E-04	1.87E-03	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	1.62E-04	1.71E-03	1.E-04	2.E-03	-	-
Carbazole	-	-	1.39E-04	1.39E-04	-	-	-	-
Chrysene	-	-	3.42E-04	2.94E-03	-	-	-	-
Dibenzo(a,h)anthracene	-	-	7.61E-05	4.68E-04	-	-	-	-
Dibenzofuran	see LMW PAHs	see LMW PAHs	4.26E-05	4.26E-05	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Diethylphthalate	-	-	5.67E-05	5.67E-05	-	-	-	-
Di-n-butylphthalate	0.11	1.1	3.44E-05	3.44E-05	3.E-04	3.E-04	3.E-05	3.E-05
Fluoranthene	-	-	5.87E-04	4.89E-03	-	-	-	-
Fluorene	see LMW PAHs	see LMW PAHs	1.09E-04	5.03E-04	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Indeno(1,2,3-cd)pyrene	-	-	1.57E-04	1.36E-03	-	-	-	-
Naphthalene	see LMW PAHs	see LMW PAHs	1.02E-04	1.02E-04	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pentachlorophenol	44	88	1.14E-04	1.14E-04	3.E-06	3.E-06	1.E-06	1.E-06
Phenanthrene	see LMW PAHs	see LMW PAHs	5.72E-04	6.04E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	7.64E-04	8.07E-03	-	-	-	-
Low Molecular Weight PAHs	40	400	1.56E-03	8.96E-03	4.E-05	2.E-04	4.E-06	2.E-05
Acetone	52	-	3.28E-04	3.28E-04	6.E-06	6.E-06	-	-
Methylene chloride	-	-	1.62E-05	1.88E-05	-	-	-	-
Toluene	-	-	2.43E-05	3.95E-04	-	-	-	-
TOTAL ESQS					1.E-01	2.E-01	5.E-03	2.E-02

Table 21. Muskrat Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	1.78E-07	1.01E-06	2.E-01	1.E+00	2.E-02	1.E-01
Aluminum	1.93	19.3	5.48E+01	8.67E+01	2.8E+01	4.5E+01	3.E+00	4.E+00
Arsenic	4.6	9.3	2.17E-02	5.92E-02	5.E-03	1.E-02	2.E-03	6.E-03
Barium	5.1	-	3.40E-01	1.00E+00	7.E-02	2.E-01	-	-
Beryllium	0.66	-	1.63E-03	4.11E-03	2.E-03	6.E-03	-	-
Cadmium	1	10	7.01E-03	4.25E-02	7.E-03	4.E-02	7.E-04	4.E-03
Chromium	2737	-	1.80E-01	8.56E-01	7.E-05	3.E-04	-	-
Cobalt	-	-	6.94E-02	1.06E-01	-	-	-	-
Copper	11.7	15.14	5.83E-01	4.07E+00	5.E-02	3.E-01	4.E-02	3.E-01
Cyanide	24	-	8.58E-02	3.57E-01	4.E-03	1.E-02	-	-
Iron	-	-	1.34E+02	1.98E+02	-	-	-	-
Lead	8	80	2.73E-01	1.11E+00	3.E-02	1.E-01	3.E-03	1.E-02
Manganese	88	284	5.80E+00	1.31E+01	7.E-02	1.E-01	2.E-02	5.E-02
Mercury	13.2	-	1.08E-02	9.17E-02	8.E-04	7.E-03	-	-
Nickel	53.5	107	1.40E-01	2.50E-01	3.E-03	5.E-03	1.E-03	2.E-03
Silver	0.375	3.75	7.67E-03	5.38E-02	2.E-02	1.E-01	2.E-03	1.E-02
Thallium	0.0131	-	1.55E-03	1.55E-03	1.E-01	1.E-01	-	-
Vanadium	0.5	5	5.65E-02	1.07E-01	1.E-01	2.E-01	1.E-02	2.E-02
Zinc	200	410	4.05E+00	1.06E+01	2.E-02	5.E-02	1.E-02	3.E-02
4,4'-DDD	-	-	4.26E-05	3.58E-04	-	-	-	-
4,4'-DDE	1	-	5.12E-05	4.95E-04	5.E-05	5.E-04	-	-
4,4'-DDT	0.8	4	2.46E-05	7.38E-05	3.E-05	9.E-05	6.E-06	2.E-05
Aldrin	0.2	1	1.48E-05	7.46E-05	7.E-05	4.E-04	1.E-05	7.E-05
alpha-BHC	1.6	3.2	2.97E-05	9.81E-05	2.E-05	6.E-05	9.E-06	3.E-05
alpha-Chlordane	4.6	9.2	1.47E-05	8.01E-05	3.E-06	2.E-05	2.E-06	9.E-06
Aroclor 1242	0.069	-	5.73E-04	2.80E-03	8.E-03	4.E-02	-	-
Aroclor 1254	0.068	0.68	9.99E-04	8.92E-03	1.E-02	1.E-01	1.E-03	1.E-02
Aroclor 1260	-	-	5.27E-04	2.79E-03	-	-	-	-
delta-BHC	0.014	0.14	1.68E-05	6.30E-05	1.E-03	4.E-03	1.E-04	4.E-04
Dieldrin	0.02	0.2	5.05E-05	9.15E-05	3.E-03	5.E-03	3.E-04	5.E-04
Endosulfan sulfate	0.15	-	5.08E-05	1.18E-04	3.E-04	8.E-04	-	-
Endrin	0.092	0.92	3.39E-05	1.57E-04	4.E-04	2.E-03	4.E-05	2.E-04
Endrin ketone	0.092	0.92	2.86E-05	1.01E-04	3.E-04	1.E-03	3.E-05	1.E-04
gamma-BHC (Lindane)	8	-	2.15E-05	6.75E-05	3.E-06	8.E-06	-	-
gamma-Chlordane	4.6	9.2	1.41E-05	5.14E-05	3.E-06	1.E-05	2.E-06	6.E-06

Table 21. Muskrat Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Heptachlor	0.0025	-	1.71E-05	3.74E-05	7.E-03	1.E-02	-	-
Heptachlor epoxide	0.1	1	4.78E-05	5.00E-05	5.E-04	5.E-04	5.E-05	5.E-05
Methoxychlor	100	200	1.42E-04	3.31E-04	1.E-06	3.E-06	7.E-07	2.E-06
2-Methylnaphthalene	see LMW PAHs	see LMW PAHs	1.22E-03	1.22E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
4-Methylphenol	219.2	-	3.33E-02	3.46E-02	2.E-04	2.E-04	-	-
Acenaphthene	see LMW PAHs	see LMW PAHs	2.49E-03	2.49E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Acenaphthylene	see LMW PAHs	see LMW PAHs	3.36E-03	1.50E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	3.86E-03	3.68E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	0.47	-	3.96E-02	3.96E-02	8.E-02	8.E-02	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	6.47E-03	5.91E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	6.46E-03	6.89E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	5.10E-03	4.03E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(g,h,i)perylene	see HMW PAHs	see HMW PAHs	2.14E-03	1.25E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	4.68E-03	3.60E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-ethylhexyl)phthalate	18.3	183.3	4.08E-03	4.32E-02	2.E-04	2.E-03	2.E-05	2.E-04
Carbazole	5	-	3.32E-03	3.32E-03	7.E-04	7.E-04	-	-
Chrysene	see HMW PAHs	see HMW PAHs	6.73E-03	5.79E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Dibenzo(a,h)anthracene	see HMW PAHs	see HMW PAHs	1.45E-03	8.90E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Dibenzofuran	see LMW PAHs	see LMW PAHs	9.88E-04	9.88E-04	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Diethylphthalate	4583	-	2.30E-03	2.30E-03	5.E-07	5.E-07	-	-
Di-n-butylphthalate	550	1833	6.78E-04	6.78E-04	1.E-06	1.E-06	4.E-07	4.E-07
Fluoranthene	see HMW PAHs	see HMW PAHs	1.23E-02	1.03E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluorine	see LMW PAHs	see LMW PAHs	2.59E-03	1.20E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	3.00E-03	2.60E-02	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Naphthalene	see LMW PAHs	see LMW PAHs	3.03E-03	3.03E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pentachlorophenol	4	13	2.36E-03	2.36E-03	6.E-04	6.E-04	2.E-04	2.E-04
Phenanthrene	see LMW PAHs	see LMW PAHs	1.29E-02	1.36E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	1.61E-02	1.70E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	2.92E-02	2.06E-01	6.E-03	4.E-02	6.E-04	4.E-03
High Molecular Weight PAHs	1	10	6.44E-02	5.83E-01	6.E-02	6.E-01	6.E-03	6.E-02
Acetone	10	50	1.77E-02	1.77E-02	2.E-03	2.E-03	4.E-04	4.E-04
Methylene chloride	5.85	50	8.15E-04	9.45E-04	1.E-04	2.E-04	2.E-05	2.E-05
Toluene	26	260	9.21E-04	1.49E-02	4.E-05	6.E-04	4.E-06	6.E-05
TOTAL ESQS					2.9E+01	4.8E+01	5.E+00	5.E+00

Spotted Sandpiper

Risks to the insectivorous spotted sandpiper from modeled COC concentrations of aquatic invertebrates as well as from the ingestion of contaminants present in Hoosic River surface water and sediment are presented in Table 22. The total mean ESQs for the NOAEL and LOAEL TRVs are 32 and 3, respectively. Mean exposure doses of all COCs received by the sandpiper were below the chronic LOAEL TRV. The mean estimated exposure doses of dioxin (ESQ is 1), aluminum (ESQ is 7), chromium (ESQ is 3), lead (ESQ is 4), zinc (ESQ is 5), 4,4-DDT (ESQ is 2), di-n-butylphthalate (ESQ is 1) and aroclor 1254 (ESQ is 5) exceed the chronic NOAEL TRV. However, mean concentrations of all of these COCs except di-n-butylphthalate are greater within the upgradient reference sediment samples collected from the Hoosic River. Therefore, risk from these COCs to the sandpiper and other insectivorous birds is not expected to be significantly greater than background risk levels. Di-n-butylphthalate was only detected at one sample location (SD-042). Although maximum concentrations of these COCs (as well as additional COCs including cadmium, copper, cyanide, mercury, aroclor 1242, and bis(2-ethylhexyl)phthalate) provide risk (ESQs above unity for NOAEL TRVs and some LOAEL TRVs) and exceed their respective upgradient concentrations, it is not likely that sandpipers would concentrate their foraging exclusively within the areas of maximum COC concentrations.

Little Brown Bat

Risk to the insectivorous little brown bat from estimated COC concentrations in emerging aquatic invertebrates (estimated from Hoosic River sediments COC concentrations) are presented in Table 23. The total mean ESQs for the NOAEL and LOAEL TRVs are 200 and 21, respectively. Mean ESQs for LOAEL TRVs exceed unity for dioxin (ESQ is 3), aluminum (ESQ is 9), copper (ESQ is 2), aroclor 1254 (ESQ is 2), and high molecular weight PAHs (ESQ is 2). Mean ESQs for chronic NOAEL TRVs are greater than unity for dioxin (ESQ is 32), aluminum (ESQ is 91), copper (ESQ is 3), silver (ESQ is 4), thallium (ESQ is 3), aroclor 1242 (ESQ is 10), aroclor 1254 (ESQ is 25), heptachlor (ESQ is 2), low molecular weight PAHs (ESQ is 1) and high molecular weight PAHs (ESQ is 22).

The mean concentrations of dioxin/furan congeners, aluminum, silver and aroclors 1242 and 1254 within the upgradient Hoosic River samples are greater than detected adjacent or downgradient of the Pownal Tannery site. Therefore, risk from mean concentrations of these COCs is no greater than background risk. In addition, the mean concentration of copper in the upgradient Hoosic River samples (23.66 mg/kg) is very similar to the mean concentration within the study area (24.9 mg/kg) and would result in the same ESQs for the NOAEL and LOAEL TRVs. Overall, increased risk to the little brown bat above background concentrations may result from detected concentrations of high molecular weight PAHs in the Hoosic River sediments. The mean high molecular weight PAH concentration results in an estimated exposure dose to the bat (through ingestion of emerging aquatic insects) that is approximately twice the chronic LOAEL TRV. Risks from mean concentrations of additional COCs detected above background levels (i.e., thallium, heptachlor, low molecular weight PAHs) are possible as exposure doses of these contaminants were estimated to exceed their respective chronic NOAEL TRVs.

Table 22. Spotted Sandpiper Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	1.62E-05	1.53E-04	1.E+00	1.E+01	1.E-01	1.E+00
Aluminum	109.7	-	7.41E+02	1.17E+03	7.E+00	1.E+01	-	-
Arsenic	5.14	12.84	4.12E-01	1.27E+00	8.E-02	2.E-01	3.E-02	1.E-01
Barium	20.8	41.7	3.27E+00	9.62E+00	2.E-01	5.E-01	8.E-02	2.E-01
Beryllium	-	-	4.44E-02	1.12E-01	-	-	-	-
Cadmium	1.4	14	3.06E-01	1.85E+00	2.E-01	1.E+00	2.E-02	1.E-01
Chromium	1	5	3.25E+00	1.54E+01	3.E+00	1.5E+01	7.E-01	3.E+00
Cobalt	-	-	1.05E+00	1.60E+00	-	-	-	-
Copper	47	61.7	2.13E+01	1.49E+02	5.E-01	3.E+00	3.E-01	2.E+00
Cyanide	0.04	-	1.95E-02	8.12E-02	5.E-01	2.E+00	-	-
Iron	-	-	1.74E+03	2.57E+03	-	-	-	-
Lead	1.13	11.3	4.84E+00	1.97E+01	4.E+00	1.7E+01	4.E-01	2.E+00
Manganese	977	-	4.41E+01	9.94E+01	5.E-02	1.E-01	-	-
Mercury	0.45	0.9	1.42E-01	1.20E+00	3.E-01	3.E+00	2.E-01	1.E+00
Nickel	77.4	107	5.14E+00	9.14E+00	7.E-02	1.E-01	5.E-02	9.E-02
Silver	178	-	7.41E-01	5.19E+00	4.E-03	3.E-02	-	-
Thallium	0.35	-	3.93E-02	3.93E-02	1.E-01	1.E-01	-	-
Vanadium	11.4	-	7.14E-01	1.35E+00	6.E-02	1.E-01	-	-
Zinc	14.5	131	7.95E+01	2.08E+02	5.E+00	1.4E+01	6.E-01	2.E+00
4,4'-DDD	-	-	9.18E-03	7.71E-02	-	-	-	-
4,4'-DDE	0.845	-	1.30E-02	1.25E-01	2.E-02	1.E-01	-	-
4,4'-DDT	0.0028	-	5.29E-03	1.59E-02	2.E+00	6.E+00	-	-
Aldrin	0.061	-	2.53E-03	1.28E-02	4.E-02	2.E-01	-	-
alpha-BHC	0.56	2.25	2.27E-03	7.52E-03	4.E-03	1.E-02	1.E-03	3.E-03
alpha-Chlordane	2.14	10.7	2.97E-03	1.62E-02	1.E-03	8.E-03	3.E-04	2.E-03
Aroclor 1242	0.41	-	3.33E-01	1.63E+00	8.E-01	4.E+00	-	-
Aroclor 1254	0.18	1.8	8.52E-01	7.60E+00	5.E+00	4.2E+01	5.E-01	4.E+00
Aroclor 1260	2.16	-	4.62E-01	2.44E+00	2.E-01	1.E+00	-	-
delta-BHC	0.56	2.25	1.73E-03	3.14E-03	3.E-03	6.E-03	8.E-04	1.E-03
Dieldrin	0.077	-	3.21E-03	5.82E-03	4.E-02	8.E-02	-	-
Endosulfan sulfate	10	-	3.71E-03	8.61E-03	4.E-04	9.E-04	-	-
Endrin	0.3	-	5.87E-03	2.73E-02	2.E-02	9.E-02	-	-
Endrin ketone	0.3	-	4.51E-03	1.60E-02	2.E-02	5.E-02	-	-
gamma-BHC (Lindane)	2	20	1.88E-03	5.93E-03	9.E-04	3.E-03	9.E-05	3.E-04
gamma-Chlordane	2.14	10.7	3.80E-03	1.39E-02	2.E-03	6.E-03	4.E-04	1.E-03

Table 22. Spotted Sandpiper Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Heptachlor	65	-	2.04E-03	4.47E-03	3.E-05	7.E-05	-	-
Heptachlor epoxide	65	-	1.30E-03	1.37E-03	2.E-05	2.E-05	-	-
Methoxychlor	-	-	1.93E-02	4.52E-02	-	-	-	-
2-Methylnaphthalene	see LMW PAHs	see LMW PAHs	1.04E-01	1.04E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
4-Methylphenol	-	-	3.36E-01	3.49E-01	-	-	-	-
Acenaphthene	see LMW PAHs	see LMW PAHs	2.31E-01	2.31E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Acenaphthylene	see LMW PAHs	see LMW PAHs	2.54E-01	1.13E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	4.73E-01	4.51E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	2.13E-01	2.13E-01	-	-	-	-
Benzo(a)anthracene	-	-	1.21E+00	1.10E+01	-	-	-	-
Benzo(a)pyrene	-	-	1.35E+00	1.44E+01	-	-	-	-
Benzo(b)fluoranthene	-	-	1.06E+00	8.41E+00	-	-	-	-
Benzo(g,h,i)perylene	-	-	4.93E-01	2.88E+00	-	-	-	-
Benzo(k)fluoranthene	-	-	9.76E-01	7.53E+00	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	3.78E-01	4.01E+00	3.E-01	4.E+00	-	-
Carbazole	-	-	3.51E-01	3.51E-01	-	-	-	-
Chrysene	-	-	1.26E+00	1.08E+01	-	-	-	-
Dibenzo(a,h)anthracene	-	-	3.53E-01	2.17E+00	-	-	-	-
Dibenzofuran	see LMW PAHs	see LMW PAHs	1.13E-01	1.13E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Diethylphthalate	-	-	4.92E-02	4.92E-02	-	-	-	-
Di-n-butylphthalate	0.11	1.1	1.27E-01	1.27E-01	1.E+00	1.E+00	1.E-01	1.E-01
Fluoranthene	-	-	1.84E+00	1.54E+01	-	-	-	-
Fluorene	see LMW PAHs	see LMW PAHs	2.77E-01	1.28E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Indeno(1,2,3-cd)pyrene	-	-	6.99E-01	6.07E+00	-	-	-	-
Naphthalene	see LMW PAHs	see LMW PAHs	1.83E-01	1.83E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pentachlorophenol	44	88	3.68E-01	3.68E-01	8.E-03	8.E-03	4.E-03	4.E-03
Phenanthrene	see LMW PAHs	see LMW PAHs	1.58E+00	1.67E+01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	2.39E+00	2.52E+01	-	-	-	-
Low Molecular Weight PAHs	40	400	3.11E+00	2.41E+01	8.E-02	6.E-01	8.E-03	6.E-02
Acetone	52	-	7.69E-03	7.69E-03	1.E-04	1.E-04	-	-
Methylene chloride	-	-	3.39E-03	3.93E-03	-	-	-	-
Toluene	-	-	2.61E-02	4.24E-01	-	-	-	-
TOTAL ESQS					3.2E+01	1.4E+02	3.E+00	1.6E+01

Table 23. Little Brown Bat Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	3.24E-05	3.84E-04	3.2E+01	3.8E+02	3.E+00	3.8E+01
Aluminum	1.93	19.3	1.75E+02	2.77E+02	9.1E+01	1.4E+02	9.E+00	1.4E+01
Arsenic	4.6	9.3	3.63E-01	1.12E+00	8.E-02	2.E-01	4.E-02	1.E-01
Barium	5.1	-	1.01E+00	2.97E+00	2.E-01	6.E-01	-	-
Beryllium	0.66	-	5.11E-02	1.29E-01	8.E-02	2.E-01	-	-
Cadmium	1	10	5.53E-01	3.36E+00	6.E-01	3.E+00	6.E-02	3.E-01
Chromium	2737	-	2.26E+00	1.07E+01	8.E-04	4.E-03	-	-
Cobalt	-	-	5.21E-01	7.99E-01	-	-	-	-
Copper	11.7	15.14	3.67E+01	2.56E+02	3.E+00	2.2E+01	2.E+00	1.7E+01
Cyanide	24	-	0.00E+00	0.00E+00	0.E+00	0.E+00	-	-
Iron	-	-	2.84E+02	4.19E+02	-	-	-	-
Lead	8	80	3.97E+00	1.61E+01	5.E-01	2.E+00	5.E-02	2.E-01
Manganese	88	284	1.09E+01	2.46E+01	1.E-01	3.E-01	4.E-02	9.E-02
Mercury	13.2	-	2.18E-01	1.85E+00	2.E-02	1.E-01	-	-
Nickel	53.5	107	7.48E+00	1.33E+01	1.E-01	2.E-01	7.E-02	1.E-01
Silver	0.375	3.75	1.41E+00	9.88E+00	4.E+00	2.6E+01	4.E-01	3.E+00
Thallium	0.0131	-	4.20E-02	4.20E-02	3.E+00	3.E+00	-	-
Vanadium	0.5	5	1.30E-01	2.46E-01	3.E-01	5.E-01	3.E-02	5.E-02
Zinc	200	410	1.43E+02	3.75E+02	7.E-01	2.E+00	3.E-01	9.E-01
4,4'-DDD	-	-	1.75E-02	1.47E-01	-	-	-	-
4,4'-DDE	1	-	2.49E-02	2.40E-01	2.E-02	2.E-01	-	-
4,4'-DDT	0.8	4	1.01E-02	3.01E-02	1.E-02	4.E-02	3.E-03	8.E-03
Aldrin	0.2	1	4.77E-03	2.41E-02	2.E-02	1.E-01	5.E-03	2.E-02
alpha-BHC	1.6	3.2	4.19E-03	1.39E-02	3.E-03	9.E-03	1.E-03	4.E-03
alpha-Chlordane	4.6	9.2	5.64E-03	3.08E-02	1.E-03	7.E-03	6.E-04	3.E-03
Aroclor 1242	0.069	-	6.60E-01	3.23E+00	1.E+01	4.7E+01	-	-
Aroclor 1254	0.068	0.68	1.69E+00	1.51E+01	2.5E+01	2.2E+02	2.E+00	2.2E+01
Aroclor 1260	-	-	9.16E-01	4.85E+00	-	-	-	-
Delta-BHC	0.014	0.14	3.20E-03	5.30E-03	2.E-01	4.E-01	2.E-02	4.E-02
Dieldrin	0.02	0.2	5.90E-03	1.07E-02	3.E-01	5.E-01	3.E-02	5.E-02
Endosulfan sulfate	0.15	-	6.83E-03	1.59E-02	5.E-02	1.E-01	-	-
Endrin	0.092	0.92	1.11E-02	5.14E-02	1.E-01	6.E-01	1.E-02	6.E-02
Endrin ketone	0.092	0.92	8.50E-03	3.01E-02	9.E-02	3.E-01	9.E-03	3.E-02
gamma-BHC (Lindane)	8	-	3.48E-03	1.10E-02	4.E-04	1.E-03	-	-

Table 23. Little Brown Bat Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
gamma-Chlordane	4.6	9.2	7.31E-03	2.67E-02	2.E-03	6.E-03	8.E-04	3.E-03
Heptachlor	0.0025	-	3.80E-03	8.33E-03	2.E+00	3.E+00	-	-
Heptachlor epoxide	0.1	1	2.36E-03	2.48E-03	2.E-02	2.E-02	2.E-03	2.E-03
Methoxychlor	100	200	3.61E-02	8.44E-02	4.E-04	8.E-04	2.E-04	4.E-04
2-Methylnaphthalene	see LMW PAHs	see LMW PAHs	1.93E-01	1.93E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
4-Methylphenol	219.2	-	5.99E-01	6.23E-01	3.E-03	3.E-03	-	-
Acenaphthene	see LMW PAHs	see LMW PAHs	4.28E-01	4.28E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Acenaphthylene	see LMW PAHs	see LMW PAHs	4.67E-01	2.08E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	8.82E-01	8.41E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	0.47	-	3.76E-01	3.76E-01	8.E-01	8.E-01	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	2.28E+00	2.08E+01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	2.56E+00	2.73E+01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	2.02E+00	1.60E+01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(g,h,i)perylene	see HMW PAHs	see HMW PAHs	9.40E-01	5.49E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	1.85E+00	1.43E+01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-ethylhexyl)phthalate	18.3	183.3	7.00E-01	7.41E+00	4.E-02	4.E-01	4.E-03	4.E-02
Carbazole	5	-	6.51E-01	6.51E-01	1.E-01	1.E-01	-	-
Chrysene	see HMW PAHs	see HMW PAHs	2.38E+00	2.05E+01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Dibenzo(a,h)anthracene	see HMW PAHs	see HMW PAHs	6.75E-01	4.15E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Dibenzofuran	see LMW PAHs	see LMW PAHs	2.09E-01	2.09E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Diethylphthalate	4583	-	8.87E-02	8.87E-02	2.E-05	2.E-05	-	-
Di-n-butylphthalate	550	1833	2.40E-01	2.40E-01	4.E-04	4.E-04	1.E-04	1.E-04
Fluoranthene	see HMW PAHs	see HMW PAHs	3.45E+00	2.88E+01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluorene	see LMW PAHs	see LMW PAHs	5.14E-01	2.38E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	1.33E+00	1.16E+01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Naphthalene	see LMW PAHs	see LMW PAHs	3.35E-01	3.35E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pentachlorophenol	4	13	6.91E-01	6.91E-01	2.E-01	2.E-01	5.E-02	5.E-02
Phenanthrene	see LMW PAHs	see LMW PAHs	2.95E+00	3.11E+01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	4.47E+00	4.72E+01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	5.79E+00	4.49E+01	1.E+00	8.E+00	1.E-01	8.E-01
High Molecular Weight PAHs	1	10	2.20E+01	1.96E+02	2.2E+01	2.0E+02	2.E+00	2.0E+01
Acetone	10	50	1.30E-02	1.30E-02	1.E-03	1.E-03	3.E-04	3.E-04
Methylene chloride	5.85	50	5.97E-03	6.92E-03	1.E-03	1.E-03	1.E-04	1.E-04
Toluene	26	260	4.73E-02	7.68E-01	2.E-03	3.E-02	2.E-04	3.E-03
TOTAL ESQS					2.0E+02	1.1E+03	2.1E+01	1.2E+02

Mallard

Risk to the omnivorous mallard from detected COC concentrations in Hoosic River surface water and sediments (as well as modeled concentrations in aquatic vegetation and invertebrates) are presented in Table 24. The total mean ESQs for the NOAEL and LOAEL TRVs are 1 and 0.1, respectively. No COC has an ESQ above unity indicating little potential risk to omnivorous waterfowl from contaminants detected within the Hoosic River surface water and sediments.

Raccoon

Risk to the omnivorous raccoon from modeled COC concentrations of aquatic vegetation and invertebrates as well as from the ingestion of contaminants present in surface water and sediment are presented in Table 25. The total mean ESQs for the NOAEL and LOAEL TRVs are 62 and 6, respectively. Mean exposure doses of all COCs received by the raccoon were below the chronic LOAEL TRV except for aluminum (ESQ is 5). The mean estimated exposure doses of dioxin (ESQ is 2), aluminum (ESQ is 55) and high molecular weight PAHs (ESQ is 1) exceed the chronic NOAEL TRV.

The mean concentrations of dioxin/furan congeners and aluminum are greater in the upgradient Hoosic River sediment samples. Therefore, risk from the mean concentrations of these constituents is no greater than the risk from mean background concentrations. A slight risk is attributable to the mean high molecular weight PAH concentrations detected in the Hoosic River sediments as the ESQ for the NOAEL TRV is 2. However, as the ESQ for the LOAEL TRV is less than unity, the actual risk to the raccoon is uncertain (i.e., modeled exposure dose is above the NOAEL but below the LOAEL).

4.4.2 Lagoon Area Aquatic Habitats

Risk to wildlife that forage within the aquatic habitats provided by the lagoons were evaluated by modeling exposure to six indicator species: the Canada goose, muskrat, spotted sandpiper, little brown bat, mallard, and raccoon. Results of this analysis is presented below for each of the indicator species.

Canada Goose

The total mean and maximum ESQs for both the NOAEL and LOAEL TRVs are less than unity (see Table 26). Therefore, it is unlikely that the Canada goose (and other herbivorous birds) would be at risk from the detected concentrations of COCs within the sediments of the lagoons.

Table 24. Mallard Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	9.55E-07	9.00E-06	7.E-02	6.E-01	7.E-03	6.E-02
Aluminum	109.7	-	7.81E+00	1.23E+01	7.E-02	1.E-01	-	-
Arsenic	5.14	12.84	1.20E-02	3.68E-02	2.E-03	7.E-03	9.E-04	3.E-03
Barium	20.8	41.7	4.49E-02	4.19E-02	2.E-03	2.E-03	1.E-03	1.E-03
Beryllium	-	-	1.63E-03	4.12E-03	-	-	-	-
Cadmium	1.4	14	1.71E-02	1.04E-01	1.E-02	7.E-02	1.E-03	7.E-03
Chromium	1	5	7.70E-02	3.65E-01	8.E-02	4.E-01	2.E-02	7.E-02
Cobalt	-	-	1.90E-02	2.91E-02	-	-	-	-
Copper	47	61.7	1.14E+00	7.95E+00	2.E-02	2.E-01	2.E-02	1.E-01
Cyanide	0.04	-	2.98E-03	1.24E-02	7.E-02	3.E-01	-	-
Iron	-	-	1.47E+01	2.17E+01	-	-	-	-
Lead	1.13	11.3	1.33E-01	5.40E-01	1.E-01	5.E-01	1.E-02	5.E-02
Manganese	977	-	5.67E-01	1.28E+00	6.E-04	1.E-03	-	-
Mercury	0.45	0.9	7.05E-03	5.97E-02	2.E-02	1.E-01	8.E-03	7.E-02
Nickel	77.4	107	2.34E-01	4.17E-01	3.E-03	5.E-03	2.E-03	4.E-03
Silver	178	-	4.32E-02	3.03E-01	2.E-04	2.E-03	-	-
Thallium	0.35	-	1.35E-03	1.35E-03	4.E-03	4.E-03	-	-
Vanadium	11.4	-	6.48E-03	1.23E-02	6.E-04	1.E-03	-	-
Zinc	14.5	131	4.51E+00	1.18E+01	3.E-01	8.E-01	3.E-02	9.E-02
4,4'-DDD	-	-	5.34E-04	4.49E-03	-	-	-	-
4,4'-DDE	0.845	-	7.60E-04	7.35E-03	9.E-04	9.E-03	-	-
4,4'-DDT	0.0028	-	3.07E-04	9.22E-04	1.E-01	3.E-01	-	-
Aldrin	0.061	-	1.46E-04	7.37E-04	2.E-03	1.E-02	-	-
alpha-BHC	0.56	2.25	1.29E-04	5.12E-01	2.E-04	9.E-01	6.E-05	2.E-01
alpha-Chlordane	2.14	10.7	1.72E-04	9.41E-04	8.E-05	4.E-04	2.E-05	9.E-05
Aroclor 1242	0.41	-	2.01E-02	9.86E-02	5.E-02	2.E-01	-	-
Aroclor 1254	0.18	1.8	5.15E-02	4.60E-01	3.E-01	3.E+00	3.E-02	3.E-01
Aroclor 1260	2.16	-	2.79E-02	1.48E-01	1.E-02	7.E-02	-	-
Delta-BHC	0.56	2.25	9.84E-05	1.64E-04	2.E-04	3.E-04	4.E-05	7.E-05
Dieldrin	0.077	-	1.82E-04	3.29E-04	2.E-03	4.E-03	-	-
Endosulfan sulfate	10	-	2.10E-04	4.88E-04	2.E-05	5.E-05	-	-
Endrin	0.3	-	3.39E-04	1.57E-03	1.E-03	5.E-03	-	-
Endrin ketone	0.3	-	2.60E-04	9.21E-04	9.E-04	3.E-03	-	-
gamma-BHC (Lindane)	2	20	1.07E-04	3.37E-04	5.E-05	2.E-04	5.E-06	2.E-05
gamma-Chlordane	2.14	10.7	2.23E-04	8.16E-04	1.E-04	4.E-04	2.E-05	8.E-05

Table 24. Mallard Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Heptachlor	65	-	1.16E-04	2.55E-04	2.E-06	4.E-06	-	-
Heptachlor epoxide	65	-	7.36E-05	7.73E-05	1.E-06	1.E-06	-	-
Methoxychlor	-	-	1.11E-03	2.59E-03	-	-	-	-
2-Methylnaphthalene	see LMW PAHs	see LMW PAHs	5.91E-03	5.92E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
4-Methylphenol	-	-	1.95E-02	2.02E-02	-	-	-	-
Acenaphthene	see LMW PAHs	see LMW PAHs	1.31E-02	1.31E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Acenaphthylene	see LMW PAHs	see LMW PAHs	1.44E-02	6.41E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	2.70E-02	2.58E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	1.28E-02	1.28E-02	-	-	-	-
Benzo(a)anthracene	-	-	6.98E-02	6.38E-01	-	-	-	-
Benzo(a)pyrene	-	-	7.84E-02	8.36E-01	-	-	-	-
Benzo(b)fluoranthene	-	-	6.18E-02	4.89E-01	-	-	-	-
Benzo(g,h,i)perylene	-	-	2.87E-02	1.68E-01	-	-	-	-
Benzo(k)fluoranthene	-	-	5.67E-02	4.37E-01	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	2.15E-02	2.28E-01	2.E-02	2.E-01	-	-
Carbazole	-	-	2.00E-02	2.00E-02	-	-	-	-
Chrysene	-	-	7.28E-02	6.27E-01	-	-	-	-
Dibenzo(a,h)anthracene	-	-	2.07E-02	1.27E-01	-	-	-	-
Dibenzofuran	see LMW PAHs	see LMW PAHs	6.42E-03	6.42E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Diethylphthalate	-	-	2.79E-03	2.79E-03	-	-	-	-
Di-n-butylphthalate	0.11	1.1	7.33E-03	7.33E-03	7.E-02	7.E-02	7E-03	7.E-03
Fluoranthene	-	-	1.06E-01	8.81E-01	-	-	-	-
Fluorene	see LMW PAHs	see LMW PAHs	1.58E-02	7.29E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Indeno(1,2,3-cd)pyrene	-	-	4.08E-02	3.54E-01	-	-	-	-
Naphthalene	see LMW PAHs	see LMW PAHs	1.03E-02	1.03E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pentachlorophenol	44	88	2.12E-02	2.12E-02	5.E-04	5.E-04	2.E-04	2.E-04
Phenanthrene	see LMW PAHs	see LMW PAHs	9.04E-02	9.55E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	1.37E-01	1.45E+00	-	-	-	-
Low Molecular Weight PAHs	40	400	2.21E-01	1.38E+00	6.E-03	3.E-02	6.E-04	3.E-03
Acetone	52	-	1.01E-03	1.01E-03	2.E-05	2.E-05	-	-
Methylene chloride	-	-	2.10E-04	2.44E-04	-	-	-	-
Toluene	-	-	1.48E-03	2.40E-02	-	-	-	-
				TOTAL ESQS	1.E+00	7.E+00	1.E-01	1.E+00

Table 25. Raccoon Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	2.34E-06	2.89E-05	2.E+00	2.9E+01	2.E-01	3.E+00
Aluminum	1.93	19.3	1.06E+02	1.68E+02	5.5E+01	8.7E+01	5.E+00	9.E+00
Arsenic	4.6	9.3	5.74E-02	1.75E-01	1.E-02	4.E-02	6.E-03	2.E-02
Barium	5.1	-	4.99E-01	1.32E+00	1.E-01	3.E-01	-	-
Beryllium	0.66	-	6.02E-03	1.52E-02	9.E-03	2.E-02	-	-
Cadmium	1	10	4.09E-02	2.48E-01	4.E-02	2.E-01	4.E-03	2.E-02
Chromium	2737	-	4.53E-01	2.15E+00	2.E-04	8.E-04	-	-
Cobalt	-	-	1.49E-01	2.28E-01	-	-	-	-
Copper	11.7	15.14	2.87E+00	2.00E+01	2.E-01	2.E+00	2.E-01	1.E+00
Cyanide	24	-	2.83E-03	1.18E-02	1.E-04	5.E-04	-	-
Iron	-	-	2.51E+02	3.70E+02	-	-	-	-
Lead	8	80	6.79E-01	2.76E+00	8.E-02	3.E-01	8.E-03	3.E-02
Manganese	88	284	7.10E+00	1.60E+01	8.E-02	2.E-01	3.E-02	6.E-02
Mercury	1	-	2.12E-02	1.79E-01	2.E-02	2.E-01	-	-
Nickel	53.5	107	6.87E-01	1.22E+00	1.E-02	2.E-02	6.E-03	1.E-02
Silver	0.375	3.75	9.66E-02	6.77E-01	3.E-01	2.E+00	3.E-02	2.E-01
Thallium	0.0131	-	5.35E-03	5.35E-03	4.E-01	4.E-01	-	-
Vanadium	0.5	5	1.03E-01	1.96E-01	2.E-01	4.E-01	2.E-02	4.E-02
Zinc	200	410	1.13E+01	2.97E+01	6.E-02	1.E-01	3.E-02	7.E-02
4,4'-DDD	-	-	1.18E-03	9.92E-03	-	-	-	-
4,4'-DDE	1	-	1.67E-03	1.61E-02	2.E-03	2.E-02	-	-
4,4'-DDT	0.8	4	6.80E-04	2.04E-03	9.E-04	3.E-03	2.E-04	5.E-04
Aldrin	0.2	1	3.26E-04	1.65E-03	2.E-03	8.E-03	3.E-04	2.E-03
alpha-BHC	0.014	0.14	2.98E-04	9.84E-04	2.E-02	7.E-02	2.E-03	7.E-03
alpha-Chlordane	4.6	9.2	3.82E-04	2.09E-03	8.E-05	5.E-04	4.E-05	2.E-04
Aroclor 1242	0.069	-	4.26E-02	2.09E-01	6.E-01	3.E+00	-	-
Aroclor 1254	0.14	0.69	1.09E-01	9.72E-01	8.E-01	7.E+00	2.E-01	1.E+00
Aroclor 1260	-	-	5.90E-02	3.12E-01	-	-	-	-
Delta-BHC	0.2	1	3.26E-04	1.65E-03	2.E-03	8.E-03	3.E-04	2.E-03
Dieldrin	0.02	0.2	4.23E-04	7.67E-04	2.E-02	4.E-02	2.E-03	4.E-03
Endosulfan sulfate	0.15	-	4.86E-04	1.13E-03	3.E-03	8.E-03	-	-
Endrin	0.092	0.92	7.57E-04	3.52E-03	8.E-03	4.E-02	8.E-04	4.E-03
Endrin ketone	0.092	0.92	5.82E-04	2.06E-03	6.E-03	2.E-02	6.E-04	2.E-03
gamma-BHC (Lindane)	8	-	2.46E-04	7.73E-04	3.E-05	1.E-04	-	-

Table 25. Raccoon Risk – Hoosic River

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
gamma-Chlordane	4.6	9.2	4.88E-04	1.78E-03	1.E-04	4.E-04	5.E-05	2.E-04
Heptachlor	0.1	1	2.64E-04	5.80E-04	3.E-03	6.E-03	3.E-04	6.E-04
Heptachlor epoxide	0.1	1	1.80E-04	1.89E-04	2.E-03	2.E-03	2.E-04	2.E-04
Methoxychlor	100	200	2.50E-03	5.84E-03	2.E-05	6.E-05	1.E-05	3.E-05
2-Methylnaphthalene	see LMW PAHs	see LMW PAHs	1.36E-02	1.36E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
4-Methylphenol	219.2	-	5.28E-02	5.48E-02	2.E-04	3.E-04	-	-
Acenaphthene	see LMW PAHs	see LMW PAHs	3.01E-02	3.01E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Acenaphthylene	see LMW PAHs	see LMW PAHs	3.32E-02	1.48E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Anthracene	see LMW PAHs	see LMW PAHs	6.13E-02	5.84E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	0.47	-	3.91E-02	3.91E-02	8.E-02	8.E-02	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	1.55E-01	1.42E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	1.74E-01	1.85E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	1.37E-01	1.08E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(g,h,i)perylene	see HMW PAHs	see HMW PAHs	6.33E-02	3.70E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	1.26E-01	9.68E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-ethylhexyl)phthalate	18.3	183.3	4.93E-02	5.22E-01	3.E-03	3.E-02	3.E-04	3.E-03
Carbazole	5	-	4.56E-02	4.56E-02	9.E-03	9.E-03	-	-
Chrysene	see HMW PAHs	see HMW PAHs	1.62E-01	1.40E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Dibenzo(a,h)anthracene	see HMW PAHs	see HMW PAHs	4.54E-02	2.79E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Dibenzofuran	see LMW PAHs	see LMW PAHs	1.46E-02	1.46E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Diethylphthalate	4583	-	6.94E-03	6.94E-03	2.E-06	2.E-06	-	-
Di-n-butylphthalate	550	1833	1.63E-02	1.63E-02	3.E-05	3.E-05	9.E-06	9.E-06
Fluoranthene	see HMW PAHs	see HMW PAHs	2.38E-01	1.98E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Fluorene	see LMW PAHs	see LMW PAHs	3.60E-02	1.66E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	8.99E-02	7.79E-01	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Naphthalene	see LMW PAHs	see LMW PAHs	2.41E-02	2.41E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pentachlorophenol	4	13	4.75E-02	4.75E-02	1.E-02	1.E-02	4.E-03	4.E-03
Phenanthrene	see LMW PAHs	see LMW PAHs	2.05E-01	2.16E+00	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	3.08E-01	3.25E+00	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	4.04E-01	3.13E+00	8.E-02	6.E-01	8.E-03	6.E-02
High Molecular Weight PAHs	1	10	1.50E+00	1.34E+01	1.E+00	1.3E+01	1.E-01	1.E+00
Acetone	10	50	6.39E-03	6.39E-03	6.E-04	6.E-04	1.E-04	1.E-04
Methylene chloride	5.85	50	6.79E-04	7.88E-04	1.E-04	1.E-04	1.E-05	2.E-05
Toluene	26	260	3.59E-03	5.83E-02	1.E-04	2.E-03	1.E-05	2.E-04
TOTAL ESQS					6.2E+01	1.5E+02	6.E+00	1.6E+01

Table 26. Canada Goose Risk – Lagoon Aquatic Area Sediments

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	1.86E-08	6.71E-08	1.E-03	5.E-03	1.E-04	5.E-04
Aluminum	109.7	-	3.76E-01	4.97E-01	3.E-03	5.E-03	-	-
Antimony			7.79E-05	5.20E-04	-	-	-	-
Arsenic	5.14	12.84	1.10E-04	1.77E-04	2.E-05	3.E-05	9.E-06	1.E-05
Barium	20.8	41.7	3.81E-03	6.59E-03	2.E-04	3.E-04	9.E-05	2.E-04
Beryllium	-	-	1.62E-05	3.01E-05	-	-	-	-
Cadmium	1.4	14	5.15E-04	1.08E-03	4.E-04	8.E-04	4.E-05	8.E-05
Chromium	1	5	2.32E-01	5.51E-01	2.E-01	6.E-01	5.E-02	1.E-01
Cobalt	-	-	4.49E-04	5.42E-04	-	-	-	-
Copper	47	61.7	1.93E-03	3.07E-03	4.E-05	7.E-05	3.E-05	5.E-05
Cyanide	0.04	-	1.43E-05	2.06E-05	4.E-04	5.E-04	-	-
Iron	-	-	8.41E-01	1.05E+00	-	-	-	-
Lead	1.13	11.3	8.91E-03	2.00E-02	8.E-03	2.E-02	8.E-04	2.E-03
Manganese	977	-	4.63E-02	7.60E-02	5.E-05	8.E-05	-	-
Mercury	0.45	0.9	1.67E-04	3.97E-04	4.E-04	9.E-04	2.E-04	4.E-04
Nickel	77.4	107	8.42E-04	1.30E-03	1.E-05	2.E-05	8.E-06	1.E-05
Selenium	0.5	1	2.00E-05	2.45E-05	4.E-05	5.E-05	2.E-05	2.E-05
Silver	178	-	4.54E-05	1.38E-04	3.E-07	8.E-07	-	-
Thallium	0.35	-	8.25E-06	8.25E-06	2.E-05	2.E-05	-	-
Vanadium	11.4	-	5.96E-04	7.98E-04	5.E-05	7.E-05	-	-
Zinc	14.5	131	1.45E-02	2.61E-02	1.E-03	2.E-03	1.E-04	2.E-04
4,4'-DDD	-	-	4.76E-07	1.83E-06	-	-	-	-
4,4'-DDE	0.845	-	2.98E-07	8.56E-07	4.E-07	1.E-06	-	-
4,4'-DDT	0.0028	-	7.12E-08	7.12E-08	3.E-05	3.E-05	-	-
Aldrin	0.061	-	7.92E-08	1.74E-07	1.E-06	3.E-06	-	-
alpha-BHC	0.56	2.25	8.68E-08	1.77E-07	2.E-07	3.E-07	4.E-08	8.E-08
alpha-Chlordane	2.14	10.7	6.05E-08	1.98E-07	3.E-08	9.E-08	6.E-09	2.E-08
Aroclor 1242	0.41	-	2.63E-06	1.14E-06	6.E-06	3.E-06	-	-
Aroclor 1248	4.74	-	3.95E-06	2.46E-05	8.E-07	5.E-06	-	-
Aroclor 1254	0.18	1.8	1.39E-06	2.95E-06	8.E-06	2.E-05	8.E-07	2.E-06
beta-BHC	0.56	2.25	1.52E-07	5.12E-07	3.E-07	9.E-07	7.E-08	2.E-07
delta-BHC	0.56	2.25	1.22E-07	3.37E-07	2.E-07	6.E-07	5.E-08	1.E-07

Table 26. Canada Goose Risk – Lagoon Aquatic Area Sediments

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Endosulfan II	10	-	3.37E-08	3.37E-08	3.E-09	3.E-09	-	-
Endosulfan sulfate	10	-	1.65E-07	4.90E-07	2.E-08	5.E-08	-	-
Endrin	0.3	-	2.35E-08	2.35E-08	8.E-08	8.E-08	-	-
Endrin ketone	0.3	-	1.55E-07	3.37E-07	5.E-07	1.E-06	-	-
gamma-BHC (Lindane)	2	20	6.98E-08	1.01E-07	3.E-08	5.E-08	3.E-09	5.E-09
gamma-Chlordane	2.14	10.7	1.18E-07	2.77E-07	6.E-08	1.E-07	1.E-08	3.E-08
Heptachlor epoxide	65	-	1.41E-07	2.50E-07	2.E-09	4.E-09	-	-
2,2-oxybis(1-chloropropane)	-	-	2.45E-05	4.79E-05	-	-	-	-
2,4-Dichlorophenol	-	-	2.98E-05	1.43E-04	-	-	-	-
2,4-Dimethylphenol	-	-	4.96E-05	2.46E-04	-	-	-	-
2-Nitroaniline	-	-	5.14E-05	5.14E-05	-	-	-	-
2-Nitrophenol	-	-	5.05E-05	1.12E-04	-	-	-	-
4-Chloro-3-methylphenol	-	-	1.62E-05	2.55E-05	-	-	-	-
4-Chloroaniline	-	-	5.13E-05	2.01E-04	-	-	-	-
4-Nitrophenol	-	-	4.54E-05	4.54E-05	-	-	-	-
Anthracene	see LMW PAHs	see LMW PAHs	1.33E-06	1.33E-06	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	5.72E-05	5.72E-05	-	-	-	-
Benzo(a)anthracene	-	-	7.42E-06	1.55E-05	-	-	-	-
Benzo(a)pyrene	-	-	7.31E-06	1.48E-05	-	-	-	-
Benzo(b)fluoranthene	-	-	6.58E-06	6.58E-06	-	-	-	-
Benzo(k)fluoranthene	-	-	7.15E-06	1.48E-05	-	-	-	-
Bis(2-chloroethoxy)methane	-	-	1.23E-04	4.96E-04	-	-	-	-
Bis(2-chloroethyl)ether	-	-	8.16E-05	1.52E-04	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	2.16E-05	8.99E-05	2.E-05	8.E-05	-	-
Caprolactam	-	-	7.60E-04	3.08E-03	-	-	-	-
Chrysene	-	-	7.21E-06	7.21E-06	-	-	-	-
Di-n-butylphthalate	0.11	1.1	3.27E-06	3.27E-06	3.E-05	3.E-05	3.E-06	3.E-06
Di-n-octylphthalate	-	-	9.18E-06	1.62E-05	-	-	-	-
Diethylphthalate	-	-	6.94E-05	2.35E-04	-	-	-	-
Fluoranthene	-	-	9.56E-06	2.48E-05	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	-	3.98E-06	3.98E-06	-	-	-	-
Isophorone	-	-	8.63E-05	4.00E-04	-	-	-	-
N-Nitroso-di-n-propylamine	-	-	8.86E-05	2.28E-04	-	-	-	-

Table 26. Canada Goose Risk – Lagoon Aquatic Area Sediments

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Naphthalene	see LMW PAHs	see LMW PAHs	1.43E-05	3.28E-05	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Nitrobenzene	-	-	1.28E-04	8.42E-04	-	-	-	-
Phenanthrene	see LMW PAHs	see LMW PAHs	8.01E-06	1.66E-05	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	9.13E-06	2.08E-05	-	-	-	-
Low Molecular Weight PAHs	40	400	2.36E-05	5.07E-05	6.E-07	1.E-06	6.E-08	1.E-07
1,2,4-Trichlorobenzene	-	-	3.54E-06	2.66E-05	-	-	-	-
1,2-Dichlorobenzene	-	-	3.84E-06	2.72E-05	-	-	-	-
1,4-Dichlorobenzene	-	-	1.68E-06	1.21E-05	-	-	-	-
2-Butanone	-	-	4.37E-05	5.44E-05	-	-	-	-
Acetone	52	-	4.19E-04	2.21E-03	8.E-06	4.E-05	-	-
Carbon Disulfide	-	-	2.89E-05	2.42E-04	-	-	-	-
Methyl Acetate	-	-	2.26E-04	1.81E-03	-	-	-	-
Methylene chloride	-	-	2.35E-06	2.35E-06	-	-	-	-
Tetrachloroethylene	-	-	5.63E-06	4.09E-05	-	-	-	-
Tetrahydrofuran	-	-	9.29E-06	9.29E-06	-	-	-	-
Toluene	-	-	3.42E-06	3.42E-06	-	-	-	-
Xylene (Total)	-	-	3.39E-07	3.39E-07	-	-	-	-
				TOTAL ESQS	2.E-01	6.E-01	5.E-02	1.E-01

Muskrat

Risk to the muskrat from detected COC concentrations in lagoon surface water and sediments (as well as modeled concentrations in aquatic vegetation) are presented in Table 27. The total mean ESQs for the NOAEL and LOAEL TRVs are 45 and 4, respectively. The only COC having a mean ESQ above unity for the LOAEL TRV is aluminum (ESQ is 4). Mean concentrations of dioxin (ESQ is 6) and aluminum (ESQ is 37) are the only COCs that exceed unity when compared to the NOAEL TRV. Dioxin and aluminum provide over 95 percent of the NOAEL risk for mean COC concentrations. The elevated aluminum ESQs are unlikely to be related to the tannery operations as both mean and maximum aluminum concentrations within the reference pond exceed lagoon concentrations of aluminum. Dioxin may potentially present a risk to the muskrat as the mean exposure dose (based on dioxin toxicity equivalency factors) exceeds by six-fold the chronic NOAEL TRV and exceeds dioxin/furan congener concentrations within the reference pond. However, the mean dioxin exposure dose to the muskrat is less than the chronic LOAEL TRV indicating adverse effects to the muskrat are uncertain. The estimated maximum exposure dose to the muskrat exceeds the LOAEL TRV (ESQ is 2) indicating that impacts may occur if foraging is restricted to the vicinity of the highest dioxin concentration.

Spotted Sandpiper

Risk to the insectivorous sandpiper from detected COC concentrations in lagoon sediments and surface water and from estimated concentrations in aquatic invertebrates are presented in Table 28. The total mean ESQs for the NOAEL and LOAEL TRVs are 880 and 170, respectively. Mean ESQs for LOAEL TRVs exceed unity for dioxin (ESQ is 2), chromium (ESQ is 160), and lead (ESQ is 3). Chromium provides nearly 95 percent of the total risk to the sandpiper based on the chronic LOAEL TRV. Mean ESQs for chronic NOAEL TRVs are greater than unity for dioxin (ESQ is 19), aluminum (ESQ is 9), cadmium (ESQ is 5), chromium (ESQ is 800), lead (ESQ is 29), mercury (ESQ is 2), zinc (ESQ is 8) and aroclor 1254 (ESQ is 1). Chromium provides over 90 percent of the total risk based on the chronic NOAEL TRV.

The mean concentrations of aluminum and zinc within the reference pond sediment samples are greater than detected within the lagoon sediments. Therefore, risk from mean concentrations of aluminum and zinc is no greater than background risk. Chromium, lead and dioxins present the greatest risk to insectivorous birds foraging within the lagoons as the mean estimated exposure doses received by these COCs exceeds both the chronic NOAEL and LOAEL TRVs (particularly for chromium which greatly exceeds its respective TRVs). Impacts from ingestion of cadmium and mercury are possible although mean estimated exposure doses are less than their respective LOAEL TRVs. Maximum estimated exposure doses of cadmium and mercury, however, exceed their respective LOAEL TRVs indicating impacts are possible if foraging is restricted to the vicinity of the highest detected concentrations.

Table 27. Muskrat Risk – Lagoon Aquatic Area Sediments

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000001	0.00001	5.70E-06	2.01E-05	6.E+00	2.0E+01	6.E-01	2.E+00
Aluminum	1.93	19.3	7.14E+01	9.44E+01	3.7E+01	4.9E+01	4.E+00	5.E+00
Antimony	0.143	1.43	1.98E-02	1.32E-01	1.E-01	9.E-01	1.E-02	9.E-02
Arsenic	4.6	9.3	2.24E-02	3.59E-02	5.E-03	8.E-03	2.E-03	4.E-03
Barium	5.1	-	9.12E-01	1.58E+00	2.E-01	3.E-01	-	-
Beryllium	0.66	-	3.12E-03	5.79E-03	-	-	-	-
Cadmium	1	10	1.67E-01	3.50E-01	2.E-01	4.E-01	2.E-02	4.E-02
Chromium	2737	-	4.43E+01	1.06E+02	2.E-02	4.E-02	-	-
Cobalt	-	-	8.82E-02	1.06E-01	-	-	-	-
Copper	11.7	15.14	5.76E-01	9.15E-01	5.E-02	8.E-02	4.E-02	6.E-02
Cyanide	24	-	2.69E-03	3.88E-03	1.E-04	2.E-04	-	-
Iron	-	-	1.60E+02	1.99E+02	-	-	-	-
Lead	8	80	1.83E+00	4.11E+00	2.E-01	5.E-01	2.E-02	5.E-02
Manganese	88	284	1.23E+01	2.01E+01	1.E-01	2.E-01	4.E-02	7.E-02
Mercury	13.2	-	6.12E-02	1.46E-01	5.E-03	1.E-02	-	-
Nickel	53.5	107	1.78E-01	2.74E-01	3.E-03	5.E-03	2.E-03	3.E-03
Selenium	0.2	0.33	3.97E-03	4.85E-03	2.E-02	2.E-02	1.E-02	1.E-02
Silver	0.375	3.75	1.35E-02	4.10E-02	4.E-02	1.E-01	4.E-03	1.E-02
Thallium	0.0131	-	1.50E-03	1.50E-03	1.E-01	1.E-01	-	-
Vanadium	0.5	-	1.16E-01	1.55E-01	2.E-01	3.E-01	-	-
Zinc	200	410	5.96E+00	1.07E+01	3.E-02	5.E-02	1.E-02	3.E-02
4,4'-DDD	-	-	9.17E-05	3.53E-04	-	-	-	-
4,4'-DDE	1	-	5.65E-05	1.62E-04	6.E-05	2.E-04	-	-
4,4'-DDT	0.8	4	1.37E-05	1.37E-05	2.E-05	2.E-05	3.E-06	3.E-06
Aldrin	0.2	1	1.59E-05	3.50E-05	8.E-05	2.E-04	2.E-05	4.E-05
alpha-BHC	1.6	3.2	2.36E-05	4.81E-05	1.E-05	3.E-05	7.E-06	2.E-05
alpha-Chlordane	4.6	9.2	3.84E-05	3.84E-05	8.E-06	8.E-06	4.E-06	4.E-06
Aroclor 1242	0.069	0.69	6.39E-04	1.44E-03	9.E-03	2.E-02	9.E-04	2.E-03
Aroclor 1248	0.01	0.1	7.73E-04	4.81E-03	8.E-02	5.E-01	8.E-03	5.E-02
Aroclor 1254	0.068	0.68	2.69E-04	5.71E-04	4.E-03	8.E-03	4.E-04	8.E-04
beta-BHC	1.6	3.2	3.97E-05	1.34E-04	2.E-05	8.E-05	1.E-05	4.E-05
delta-BHC	1.6	3.2	2.95E-05	8.15E-05	2.E-05	5.E-05	9.E-06	3.E-05

Table 27. Muskrat Risk – Lagoon Aquatic Area Sediments

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Endosulfan II	0.15	-	9.11E-06	9.11E-06	6.E-05	6.E-05	-	-
Endosulfan sulfate	0.15	-	4.58E-05	1.36E-04	3.E-04	9.E-04	-	-
Endrin	0.092	0.92	4.72E-06	4.72E-06	5.E-05	5.E-05	5.E-06	5.E-06
Endrin ketone	0.092	0.92	3.30E-05	7.16E-05	4.E-04	8.E-04	4.E-05	8.E-05
gamma-BHC (Lindane)	8	-	1.80E-05	2.60E-05	2.E-06	3.E-06	-	-
gamma-Chlordane	4.6	9.2	2.23E-05	5.24E-05	5.E-06	1.E-05	2.E-06	6.E-06
Heptachlor epoxide	0.0025	-	5.40E-05	9.56E-05	2.E-02	4.E-02	-	-
2,2-oxybis(1-chloropropane)	-	-	9.99E-03	1.95E-02	-	-	-	-
2,4-Dichlorophenol	5.8	-	1.06E-02	5.10E-02	2.E-03	9.E-03	-	-
2,4-Dimethylphenol	4	-	2.12E-02	1.05E-01	5.E-03	3.E-02	-	-
2-Nitroaniline	3.75	-	2.43E-02	2.43E-02	6.E-03	6.E-03	-	-
2-Nitrophenol	-	-	2.40E-02	5.32E-02	-	-	-	-
4-Chloro-3-methylphenol	-	-	5.62E-03	8.85E-03	-	-	-	-
4-Chloroaniline	-	-	2.33E-02	9.11E-02	-	-	-	-
4-Nitrophenol	-	-	2.10E-02	2.10E-02	-	-	-	-
Anthracene	see LMW PAHs	see LMW PAHs	3.00E-04	3.00E-04	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	2.83E-02	2.83E-02	-	-	-	-
Benzo(a)anthracene	see HMW PAHs	see HMW PAHs	1.46E-03	3.06E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(a)pyrene	see HMW PAHs	see HMW PAHs	1.41E-03	2.86E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(b)fluoranthene	see HMW PAHs	see HMW PAHs	1.27E-03	1.27E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Benzo(k)fluoranthene	see HMW PAHs	see HMW PAHs	1.38E-03	2.86E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Bis(2-chloroethoxy)methane	-	-	6.19E-02	2.50E-01	-	-	-	-
Bis(2-chloroethyl)ether	0.075	-	4.11E-02	7.67E-02	5.E-01	1.E+00	-	-
Bis(2-ethylhexyl)phthalate	18.3	183.3	4.86E-03	2.25E-02	3.E-04	1.E-03	3.E-05	1.E-04
Caprolactam	-	-	4.09E-01	1.65E+00	-	-	-	-
Chrysene	see HMW PAHs	see HMW PAHs	1.42E-03	1.42E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Di-n-butylphthalate	550	1833	6.45E-04	6.45E-04	1.E-06	1.E-06	4.E-07	4.E-07
Di-n-octylphthalate	7500	-	1.73E-03	3.07E-03	2.E-07	4.E-07	-	-
Diethylphthalate	4583	-	2.81E-02	9.53E-02	6.E-06	2.E-05	-	-
Fluoranthene	see HMW PAHs	see HMW PAHs	2.01E-03	5.19E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Indeno(1,2,3-cd)pyrene	see HMW PAHs	see HMW PAHs	7.59E-04	7.59E-04	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Isophorone	3.45	-	4.16E-02	1.93E-01	1.E-02	6.E-02	-	-
N-Nitroso-di-n-propylamine	-	-	4.45E-02	1.15E-01	-	-	-	-

Table 27. Muskrat Risk – Lagoon Aquatic Area Sediments

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Naphthalene	see LMW PAHs	see LMW PAHs	4.26E-03	9.79E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Nitrobenzene	0.64	-	6.02E-02	3.95E-01	9.E-02	6.E-01	-	-
Phenanthrene	see LMW PAHs	see LMW PAHs	1.81E-03	3.75E-03	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	see HMW PAHs	see HMW PAHs	1.92E-03	4.37E-03	see HMW PAHs	see HMW PAHs	see HMW PAHs	see HMW PAHs
Low Molecular Weight PAHs	5.3	53	6.37E-03	1.38E-02	1.E-03	3.E-03	1.E-04	3.E-04
High Molecular Weight PAHs	1	10	1.16E-02	2.18E-02	1.E-02	2.E-02	1.E-03	2.E-03
1,2,4-Trichlorobenzene	-	-	8.22E-04	6.18E-03	-	-	-	-
1,2-Dichlorobenzene	-	-	1.09E-03	7.70E-03	-	-	-	-
1,4-Dichlorobenzene	-	-	4.74E-04	3.43E-03	-	-	-	-
2-Butanone	1771	4571	2.27E-02	2.80E-02	1.E-05	2.E-05	5.E-06	6.E-06
Acetone	10	50	1.83E-01	3.36E-01	2.E-02	3.E-02	4.E-03	7.E-03
Carbon Disulfide	-	-	1.29E-02	1.08E-01	-	-	-	-
Methyl Acetate	-	-	1.21E-01	9.70E-01	-	-	-	-
Methylene chloride	5.85	50	1.18E-03	1.18E-03	2.E-04	2.E-04	2.E-05	2.E-05
Tetrachloroethylene	1.4	7	2.22E-03	1.61E-02	2.E-03	1.E-02	3.E-04	2.E-03
Tetrahydrofuran	-	-	4.92E-03	4.92E-03	-	-	-	-
Toluene	26	260	5.68E-04	5.68E-04	2.E-05	2.E-05	2.E-06	2.E-06
Xylene (Total)	2.1	2.6	1.07E-04	1.07E-04	5.E-05	5.E-05	4.E-05	4.E-05
TOTAL ESQS					4.5E+01	7.4E+01	4.E+0	7.E+00

Table 28. Spotted Sandpiper Risk – Lagoon Aquatic Area Sediments

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Dioxin TEFs	0.000014	0.00014	2.67E-04	9.64E-04	1.9E+01	6.9E+01	2.E+00	7.E+00
Aluminum	109.7	-	9.64E+02	1.28E+03	9.E+00	1.2E+01	-	-
Antimony			3.09E-01	2.06E+00	-	-	-	-
Arsenic	2.46	7.38	4.24E-01	6.80E-01	2.E-01	3.E-01	6.E-02	9.E-02
Barium	20.8	41.7	8.74E+00	1.51E+01	4.E-01	7.E-01	2.E-01	4.E-01
Beryllium	-	-	8.53E-02	1.58E-01	-	-	-	-
Cadmium	1.4	14	7.28E+00	1.53E+01	5.E+00	1.1E+01	5.E-01	1.E+00
Chromium	1	5	7.99E+02	1.90E+03	8.0E+02	1.9E+03	1.6E+02	3.8E+02
Cobalt	-	-	1.33E+00	1.60E+00	-	-	-	-
Copper	47	61.7	2.10E+01	3.34E+01	4.E-01	7.E-01	3.E-01	5.E-01
Cyanide	0.04	-	3.25E-02	4.68E-02	8.E-01	1.E+00	-	-
Iron	-	-	2.07E+03	2.59E+03	-	-	-	-
Lead	1.13	11.3	3.25E+01	7.31E+01	2.9E+01	6.5E+01	3.E+00	6.E+00
Manganese	977	-	9.31E+01	1.52E+02	1.E-01	2.E-01	-	-
Mercury	0.45	0.9	8.02E-01	1.91E+00	2.E+00	4.E+00	9.E-01	2.E+00
Nickel	77.4	107	6.50E+00	1.00E+01	8.E-02	1.E-01	6.E-02	9.E-02
Selenium	0.5	1	1.11E-01	1.36E-01	2.E-01	3.E-01	1.E-01	1.E-01
Silver	178	-	1.31E+00	3.95E+00	7.E-03	2.E-02	-	-
Thallium	0.35	-	3.44E-02	3.44E-02	1.E-01	1.E-01	-	-
Vanadium	1.5	2.2	1.47E+00	1.96E+00	1.E+00	1.E+00	7.E-01	9.E-01
Zinc	14.5	131	1.17E+02	2.11E+02	8.E+00	1.5E+01	9.E-01	2.E+00
4,4'-DDD	-	-	5.81E-03	2.24E-02	-	-	-	-
4,4'-DDE	0.845	-	4.14E-03	1.19E-02	5.E-03	1.E-02	-	-
4,4'-DDT	0.0028	-	8.67E-04	8.67E-04	3.E-01	3.E-01	-	-
Aldrin	0.061	-	8.23E-04	1.81E-03	1.E-02	3.E-02	-	-
alpha-BHC	0.56	2.25	5.72E-04	1.17E-03	1.E-03	2.E-03	3.E-04	5.E-04
alpha-Chlordane	2.14	10.7	2.39E-03	2.39E-03	1.E-03	1.E-03	2.E-04	2.E-04
Aroclor 1242	0.41	-	3.72E-01	8.37E-01	9.E-01	2.E+00	-	-
Aroclor 1248	4.74	-	6.48E-01	4.03E+00	1.E-01	9.E-01	-	-
Aroclor 1254	0.18	1.8	2.29E-01	4.86E-01	1.E+00	3.E+00	1.E-01	3.E-01
beta-BHC	0.56	2.25	1.05E-03	3.55E-03	2.E-03	6.E-03	5.E-04	2.E-03
delta-BHC	0.56	2.25	9.50E-04	2.62E-03	2.E-03	5.E-03	4.E-04	1.E-03

Table 28. Spotted Sandpiper Risk – Lagoon Aquatic Area Sediments

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Endosulfan II	10	-	2.24E-04	2.24E-04	2.E-05	2.E-05	-	-
Endosulfan sulfate	10	-	1.06E-03	3.14E-03	1.E-04	3.E-04	-	-
Endrin	0.01	0.1	2.46E-04	2.46E-04	2.E-02	2.E-02	2.E-03	2.E-03
Endrin ketone	0.01	0.1	1.57E-03	3.40E-03	2.E-01	3.E-01	2.E-02	3.E-02
gamma-BHC (Lindane)	2	20	4.96E-04	7.17E-04	2.E-04	4.E-04	2.E-05	4.E-05
gamma-Chlordane	2.14	10.7	1.73E-03	4.06E-03	8.E-04	2.E-03	2.E-04	4.E-04
Heptachlor epoxide	65	-	4.85E-04	8.54E-04	7.E-06	1.E-05	-	-
2,2-oxybis(1-chloropropane)	-	-	6.87E-02	1.34E-01	-	-	-	-
2,4-Dichlorophenol	-	-	1.22E-01	5.86E-01	-	-	-	-
2,4-Dimethylphenol	-	-	1.17E-01	5.79E-01	-	-	-	-
2-Nitroaniline	-	-	6.89E-02	6.89E-02	-	-	-	-
2-Nitrophenol	-	-	6.52E-02	1.44E-01	-	-	-	-
4-Chloro-3-methylphenol	-	-	6.97E-02	1.10E-01	-	-	-	-
4-Chloroaniline	-	-	8.97E-02	3.51E-01	-	-	-	-
4-Nitrophenol	-	-	6.99E-02	6.99E-02	-	-	-	-
Anthracene	see LMW PAHs	see LMW PAHs	1.14E-02	1.14E-02	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Benzaldehyde	-	-	5.23E-02	5.23E-02	-	-	-	-
Benzo(a)anthracene	-	-	8.15E-02	1.71E-01	-	-	-	-
Benzo(a)pyrene	-	-	8.71E-02	1.77E-01	-	-	-	-
Benzo(b)fluoranthene	-	-	7.85E-02	7.85E-02	-	-	-	-
Benzo(k)fluoranthene	-	-	8.52E-02	1.77E-01	-	-	-	-
Bis(2-chloroethoxy)methane	-	-	8.40E-02	3.40E-01	-	-	-	-
Bis(2-chloroethyl)ether	-	-	5.85E-02	1.09E-01	-	-	-	-
Bis(2-ethylhexyl)phthalate	1.1	-	1.37E-01	6.52E-01	1.E-01	6.E-01	-	-
Caprolactam	-	-	1.51E-01	4.97E-01	-	-	-	-
Chrysene	-	-	7.94E-02	7.94E-02	-	-	-	-
Di-n-butylphthalate	0.11	1.1	3.60E-02	3.60E-02	3.E-01	3.E-01	3.E-02	3.E-02
Di-n-octylphthalate	-	-	1.54E-01	2.73E-01	-	-	-	-
Diethylphthalate	-	-	1.99E-01	6.74E-01	-	-	-	-
Fluoranthene	-	-	9.14E-02	2.37E-01	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	-	5.17E-02	5.17E-02	-	-	-	-
Isophorone	-	-	1.00E-01	4.64E-01	-	-	-	-
N-Nitroso-di-n-propylamine	-	-	6.51E-02	1.68E-01	-	-	-	-

Table 28. Spotted Sandpiper Risk – Lagoon Aquatic Area Sediments

Contaminant of Concern	NOAEL TRV (mg/kg-BW/day)	LOAEL TRV (mg/kg-BW/day)	Mean Total Dose (mg/kg-BW/day)	Maximum Total Dose (mg/kg-BW/day)	Mean NOAEL ESQ	Maximum NOAEL ESQ	Mean LOAEL ESQ	Maximum LOAEL ESQ
Naphthalene	see LMW PAHs	see LMW PAHs	8.20E-02	1.88E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Nitrobenzene	-	-	1.83E-01	1.20E+00	-	-	-	-
Phenanthrene	see LMW PAHs	see LMW PAHs	6.85E-02	1.42E-01	see LMW PAHs	see LMW PAHs	see LMW PAHs	see LMW PAHs
Pyrene	-	-	8.69E-02	1.98E-01	-	-	-	-
Low Molecular Weight PAHs	40	400	1.62E-01	3.41E-01	4.E-03	9.E-03	4.E-04	9.E-04
1,2,4-Trichlorobenzene	-	-	2.89E-02	2.17E-01	-	-	-	-
1,2-Dichlorobenzene	-	-	2.39E-02	1.70E-01	-	-	-	-
1,4-Dichlorobenzene	-	-	1.04E-02	7.56E-02	-	-	-	-
2-Butanone	-	-	1.33E-02	1.63E-02	-	-	-	-
Acetone	52	-	3.01E-02	5.51E-02	6.E-04	1.E-03	-	-
Carbon Disulfide	-	-	5.63E-02	4.72E-01	-	-	-	-
Methyl Acetate	-	-	3.55E-02	2.85E-01	-	-	-	-
Methylene chloride	-	-	1.71E-03	1.71E-03	-	-	-	-
Tetrachloroethylene	-	-	1.77E-02	1.28E-01	-	-	-	-
Tetrahydrofuran	-	-	3.84E-03	3.84E-03	-	-	-	-
Toluene	-	-	2.31E-03	2.31E-03	-	-	-	-
Xylene (Total)	-	-	1.75E-03	1.75E-03	-	-	-	-
				TOTAL ESQS	8.8E+02	2.1E+03	1.7E+02	4.0E+02